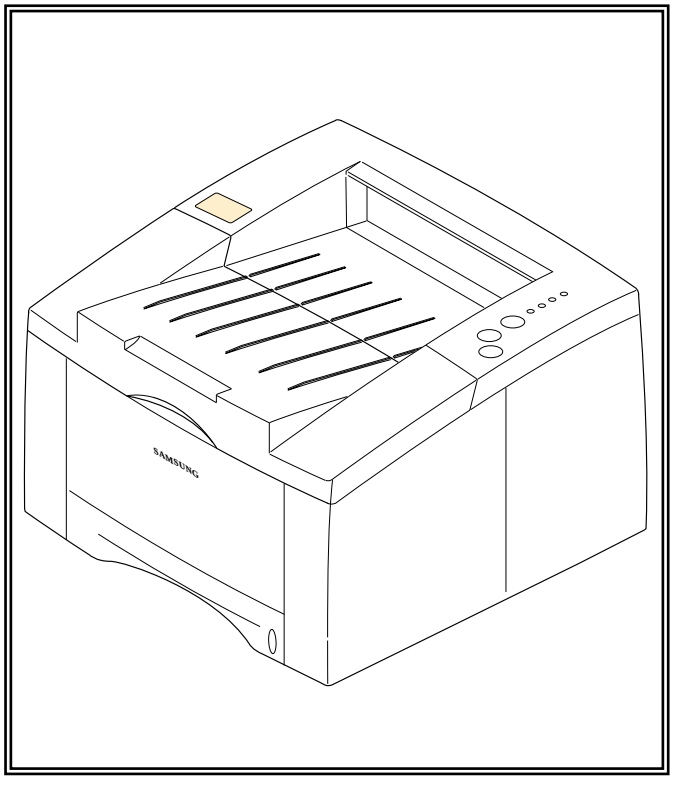
SAMSUNG

LASER PRINTER

ML-6040/XEU

SERVICE *Manual*

LASER PRINTER



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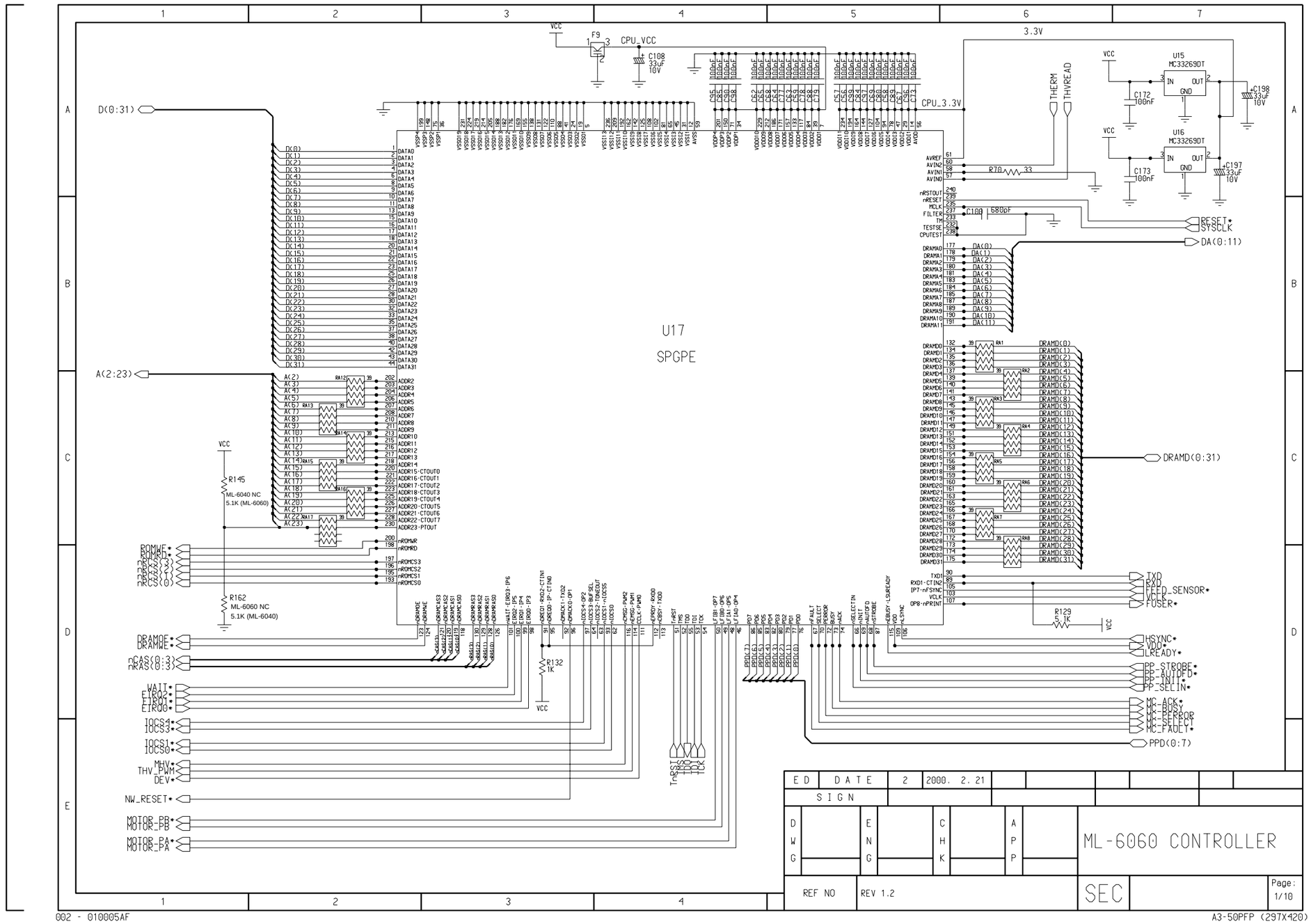
10. Schematic Diagrams

10-1 Main Circuit Diagram(1/9)



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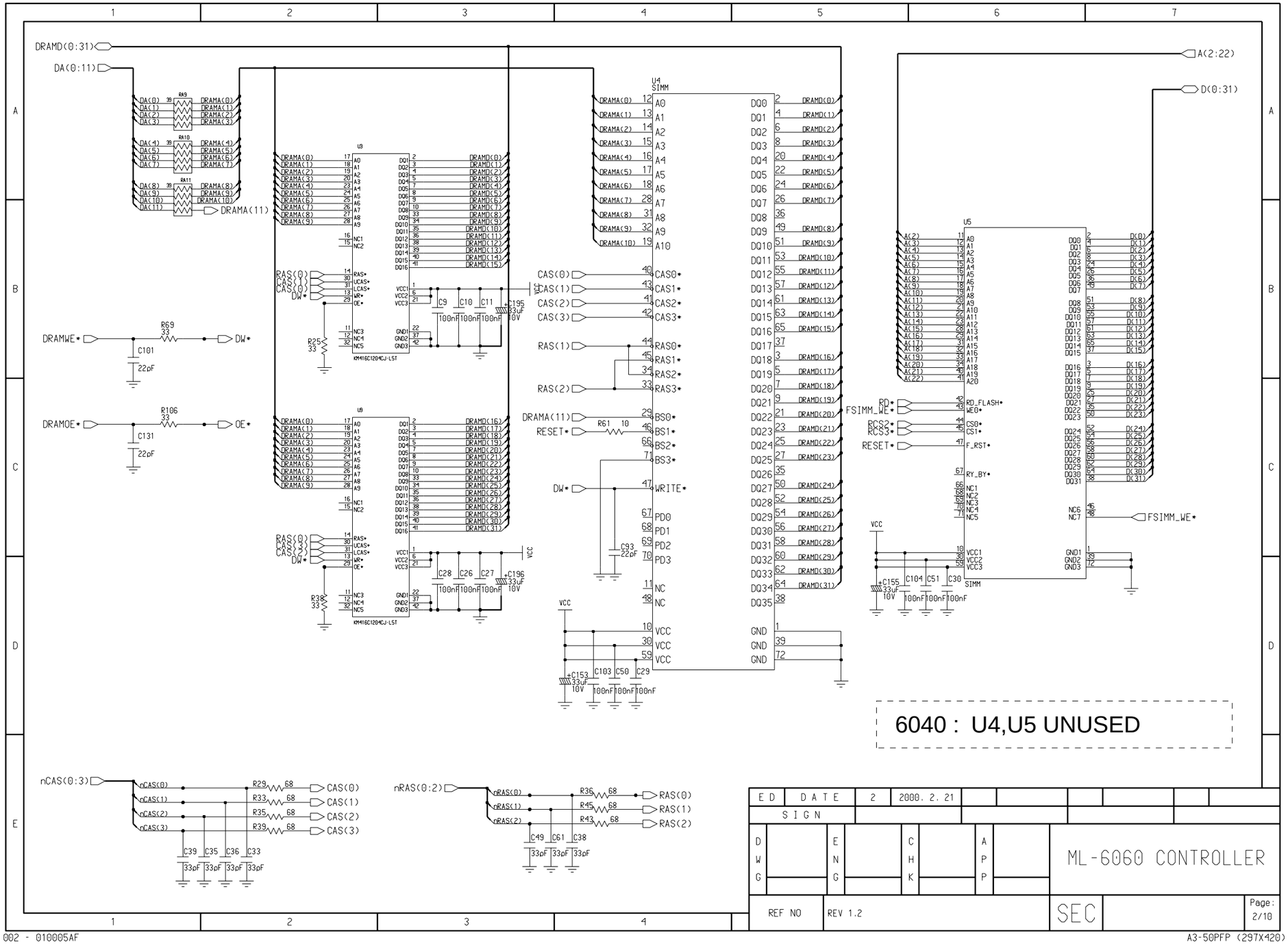
Main Circuit Diagram(2/9)



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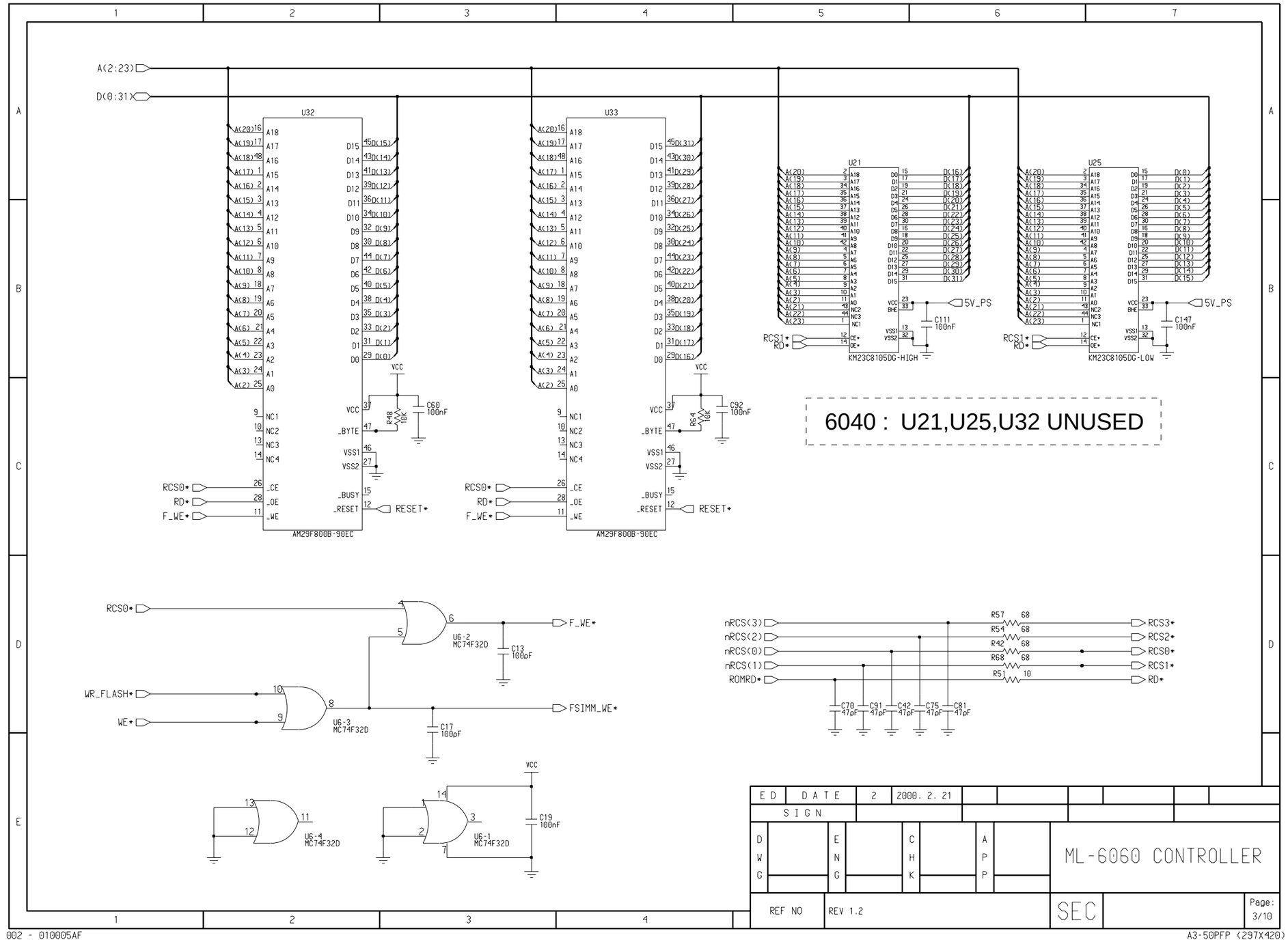
Main Circuit Diagram(3/9)



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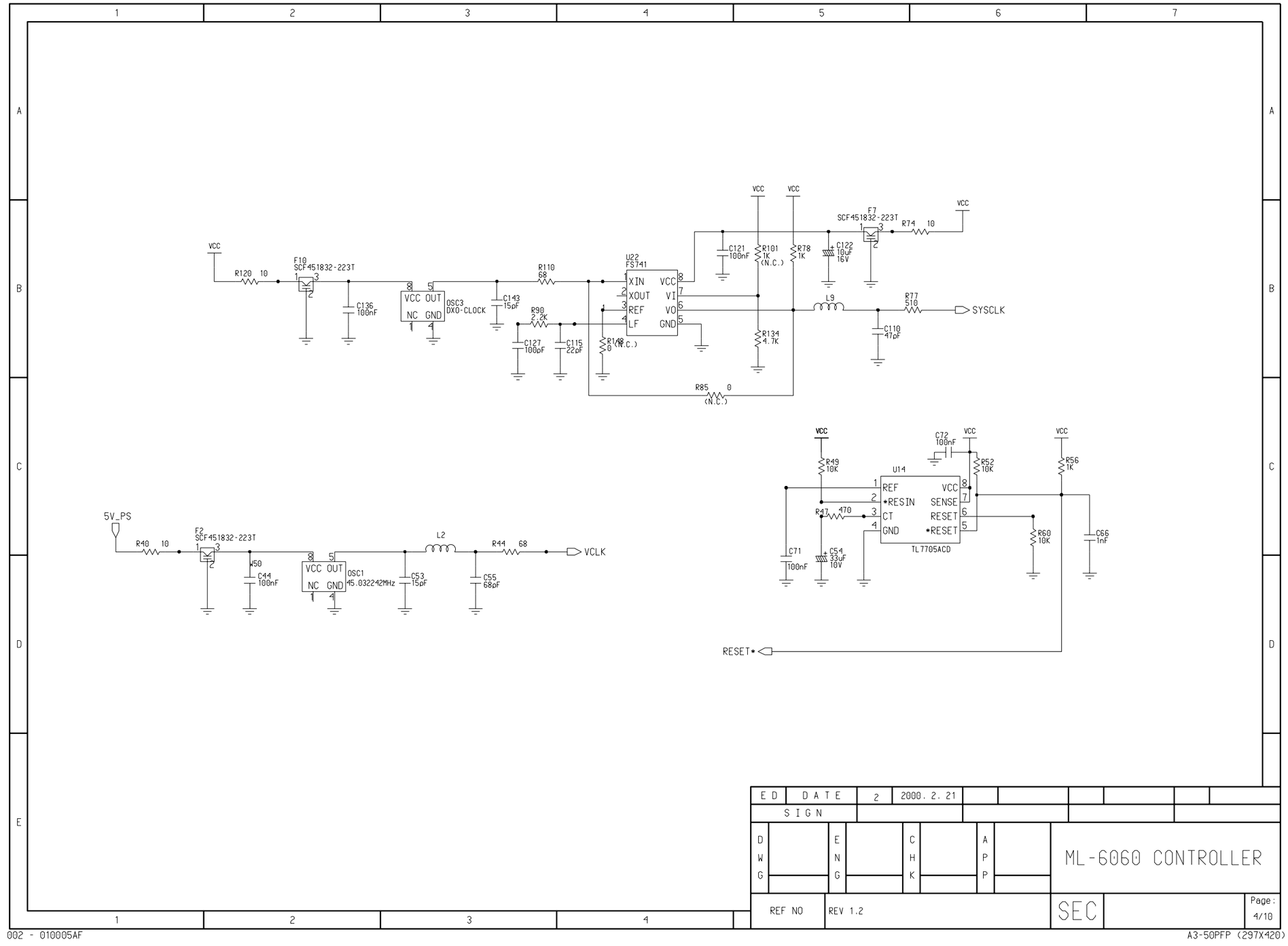
Main Circuit Diagram(4/9)



ED	DATE	2	2000. 2. 21
SIGN			

DWG	ENG	CHK	APP	ML-6060 CONTROLLER

REF NO	REV 1.2	SEC	Page : 4/10

002 - 010005AF

A3-50PFP (297X420)

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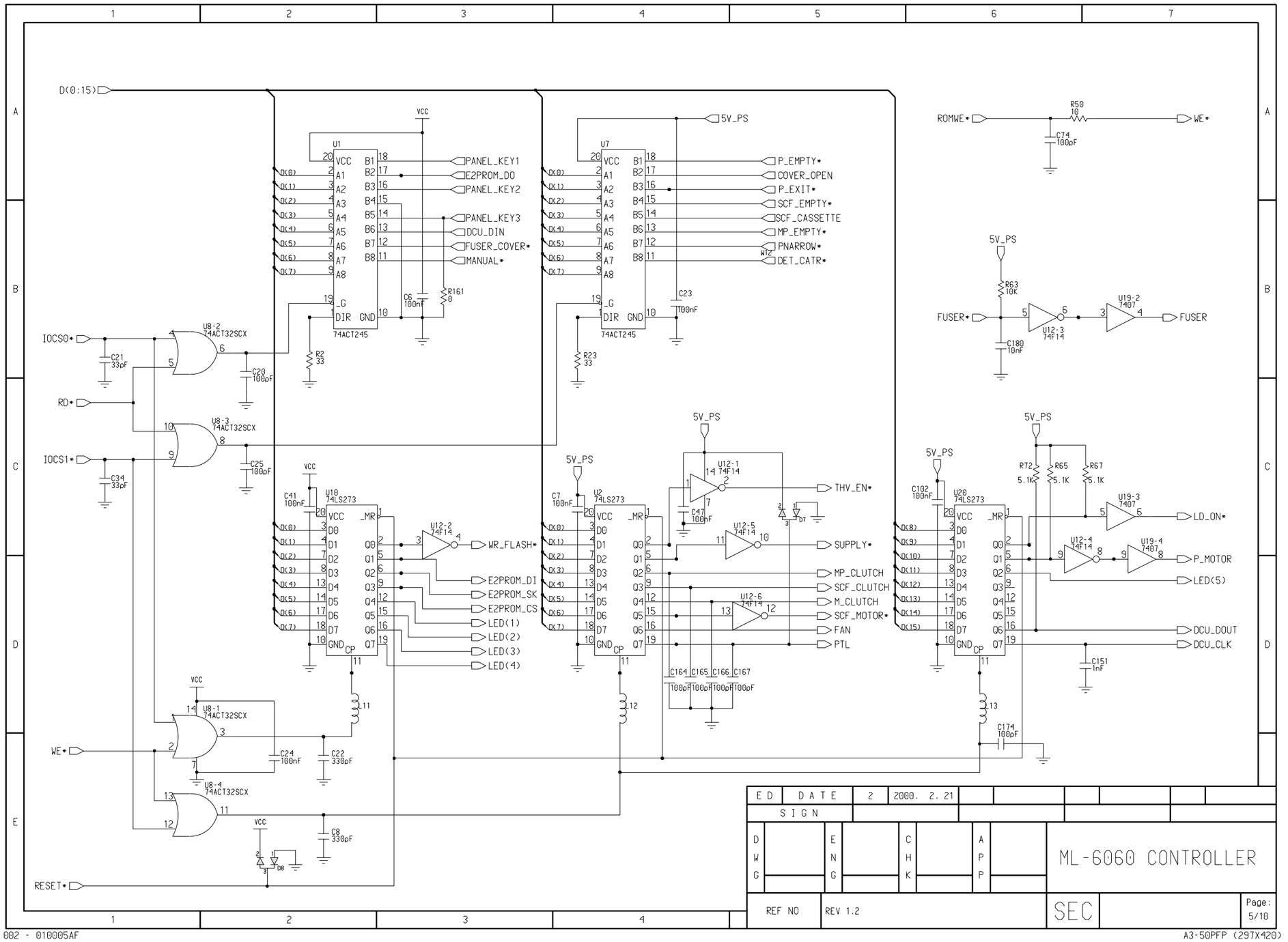
Main Circuit Diagram(5/9)



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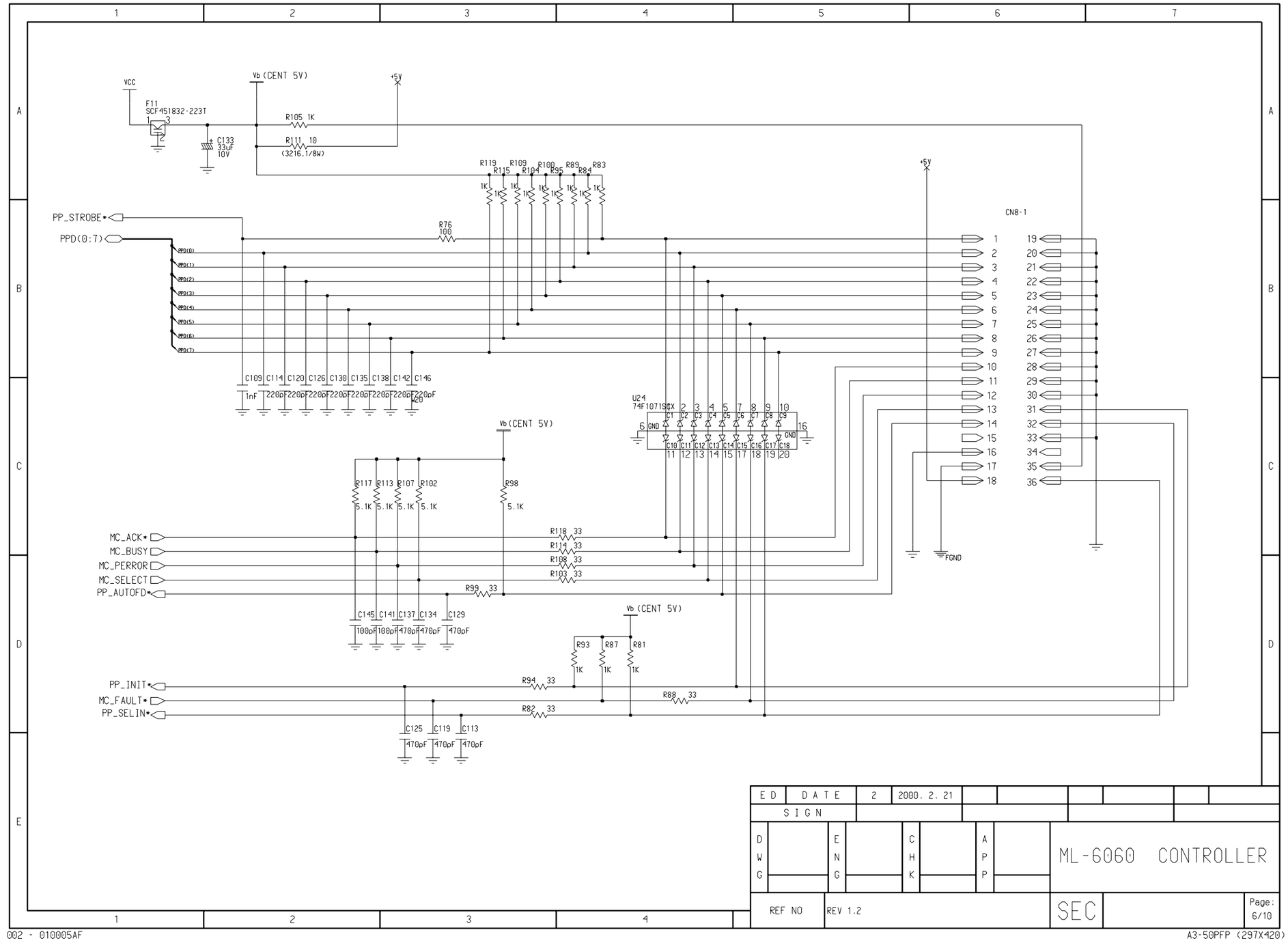
Main Circuit Diagram(6/9)



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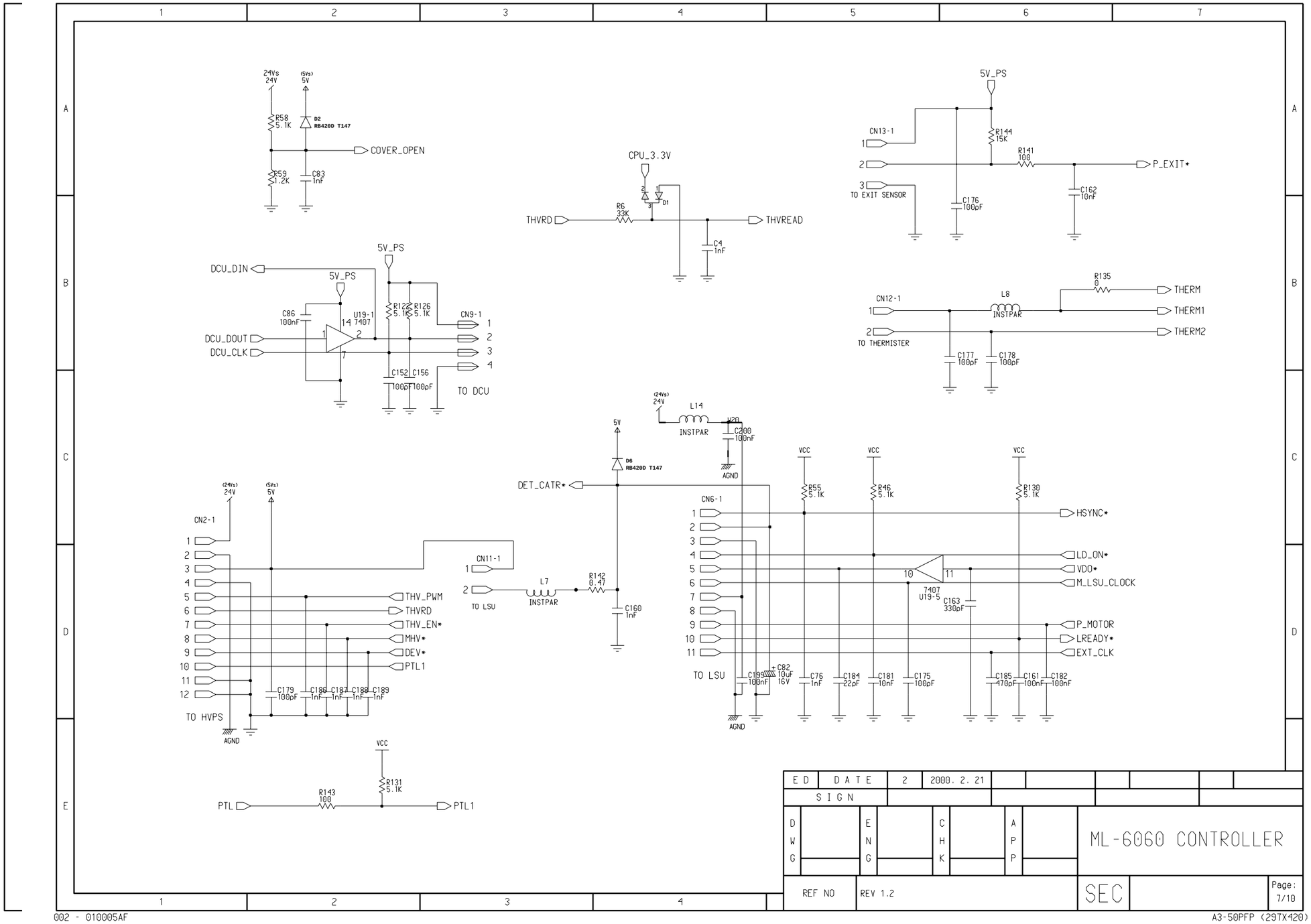
Main Circuit Diagram(7/9)



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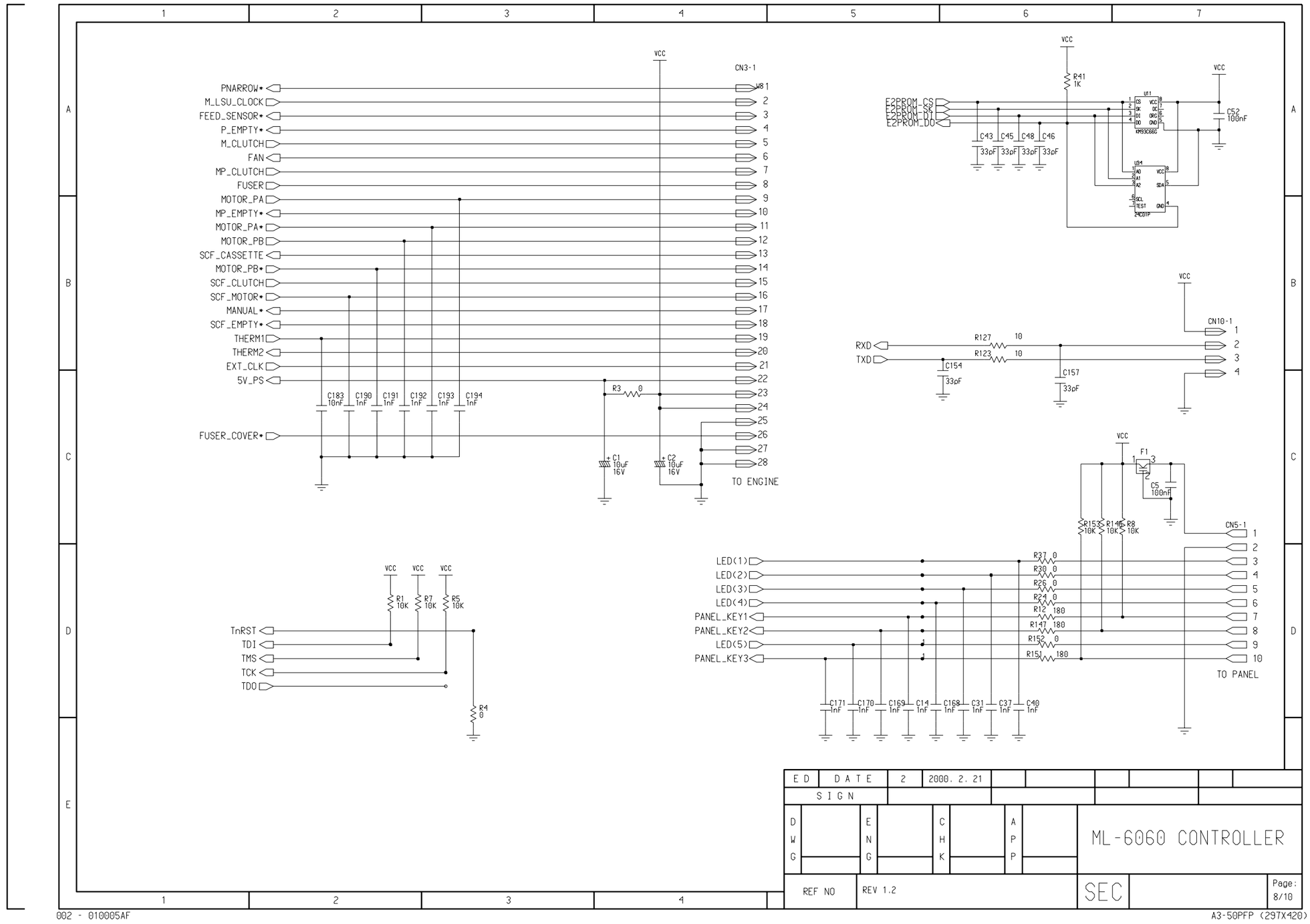
Main Circuit Diagram(8/9)



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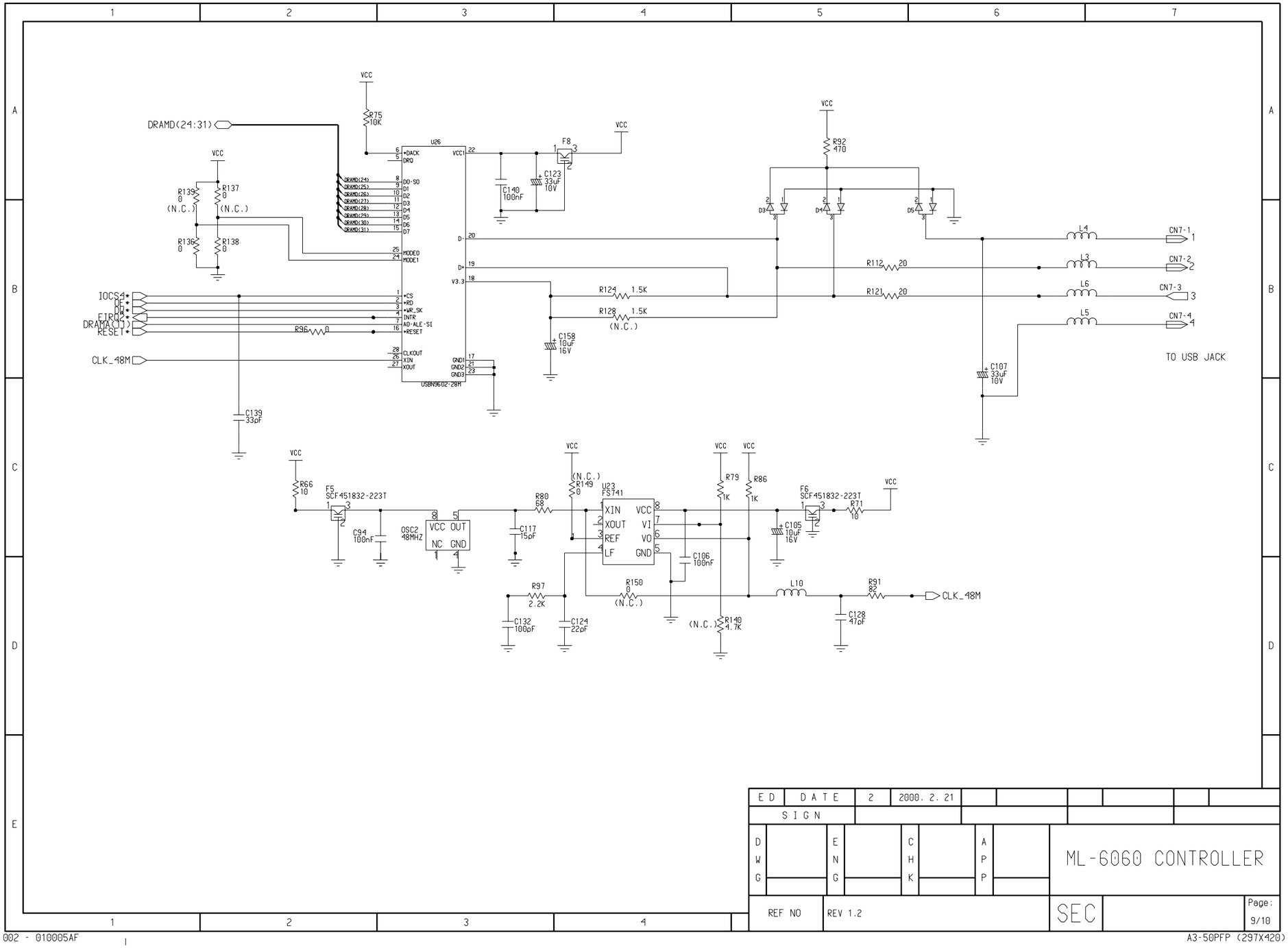
Main Circuit Diagram(9/9)



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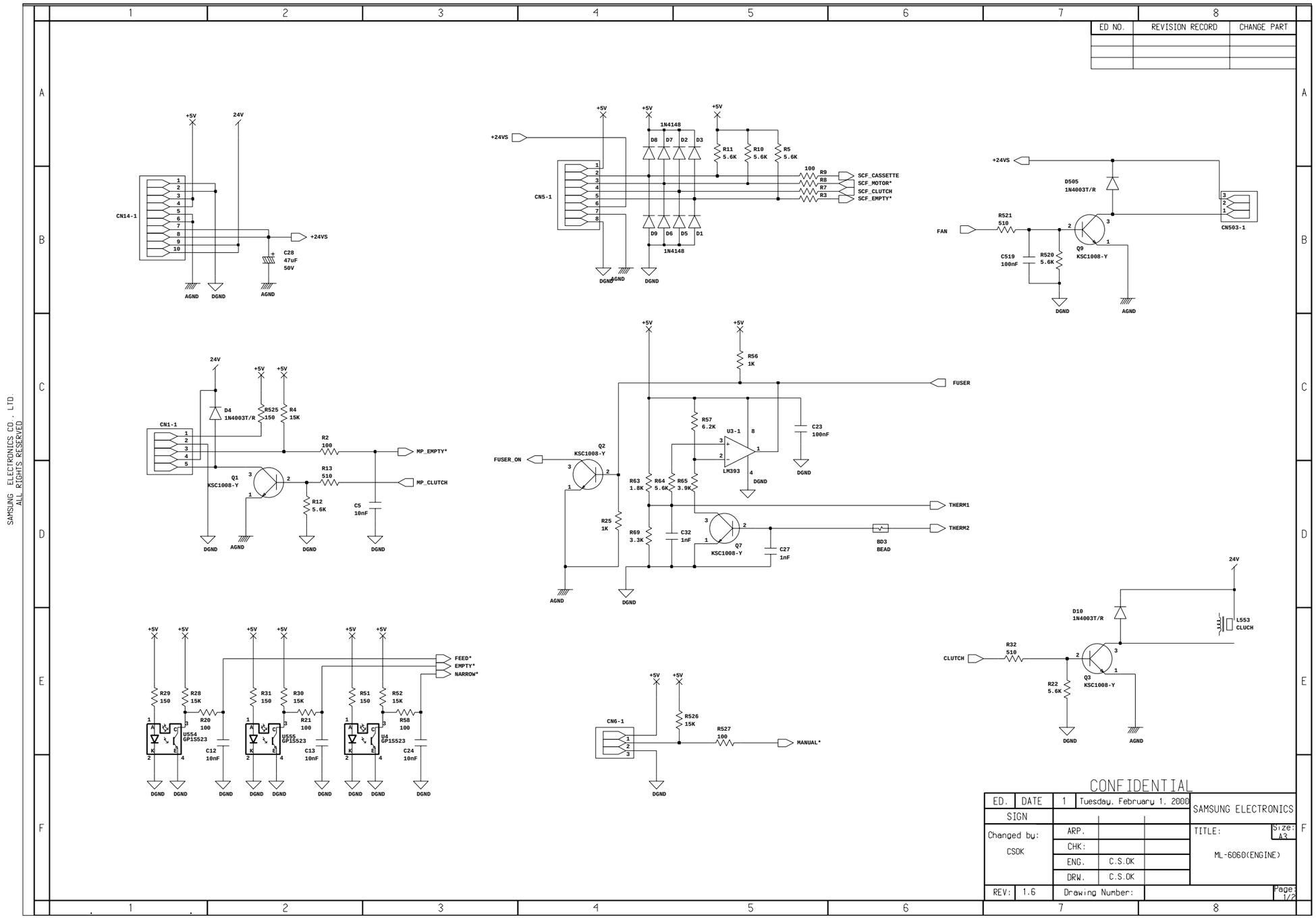
10-2 Engine Circuit Diagram(1/2)



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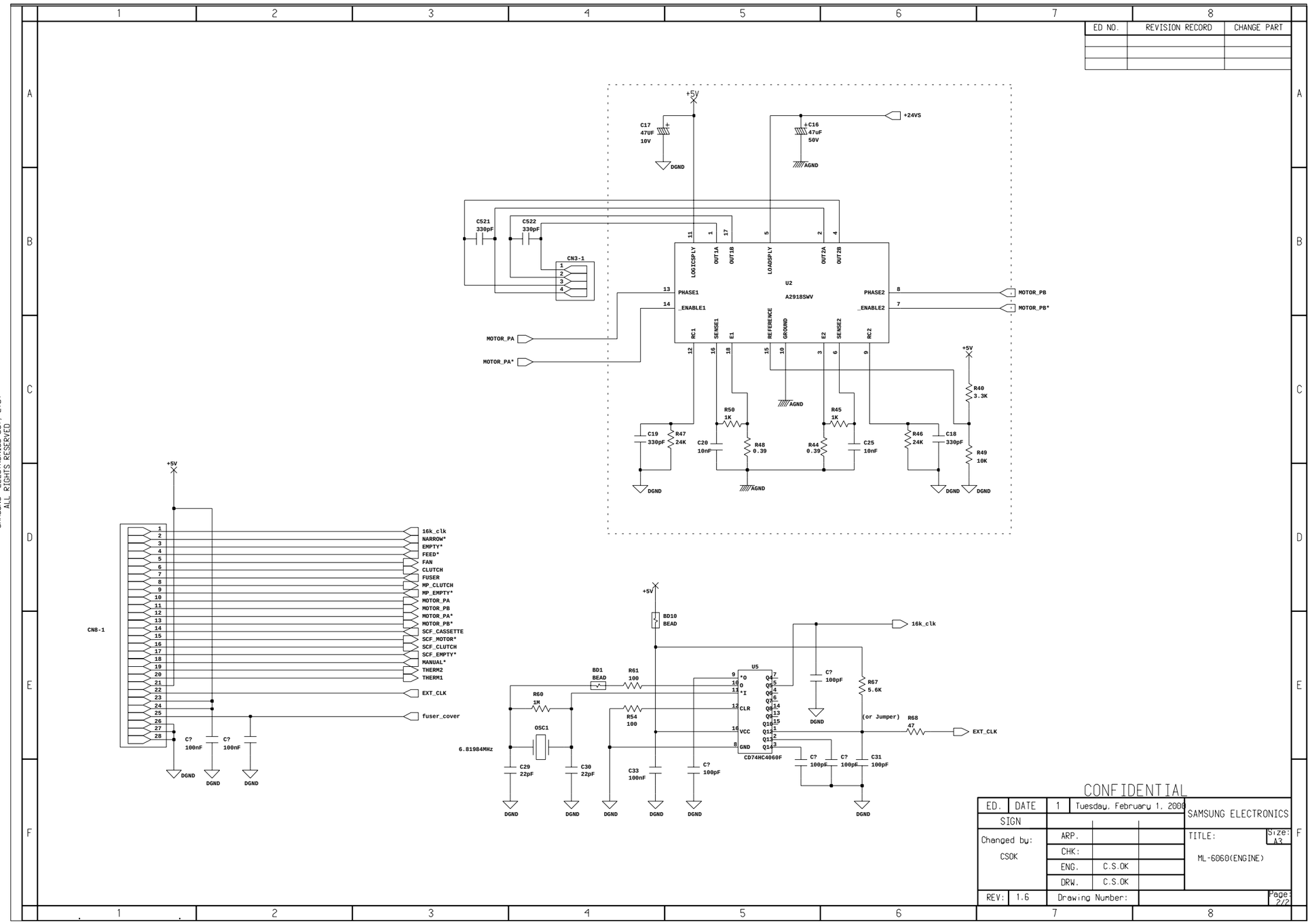
Engine Circuit Diagram(2/2)



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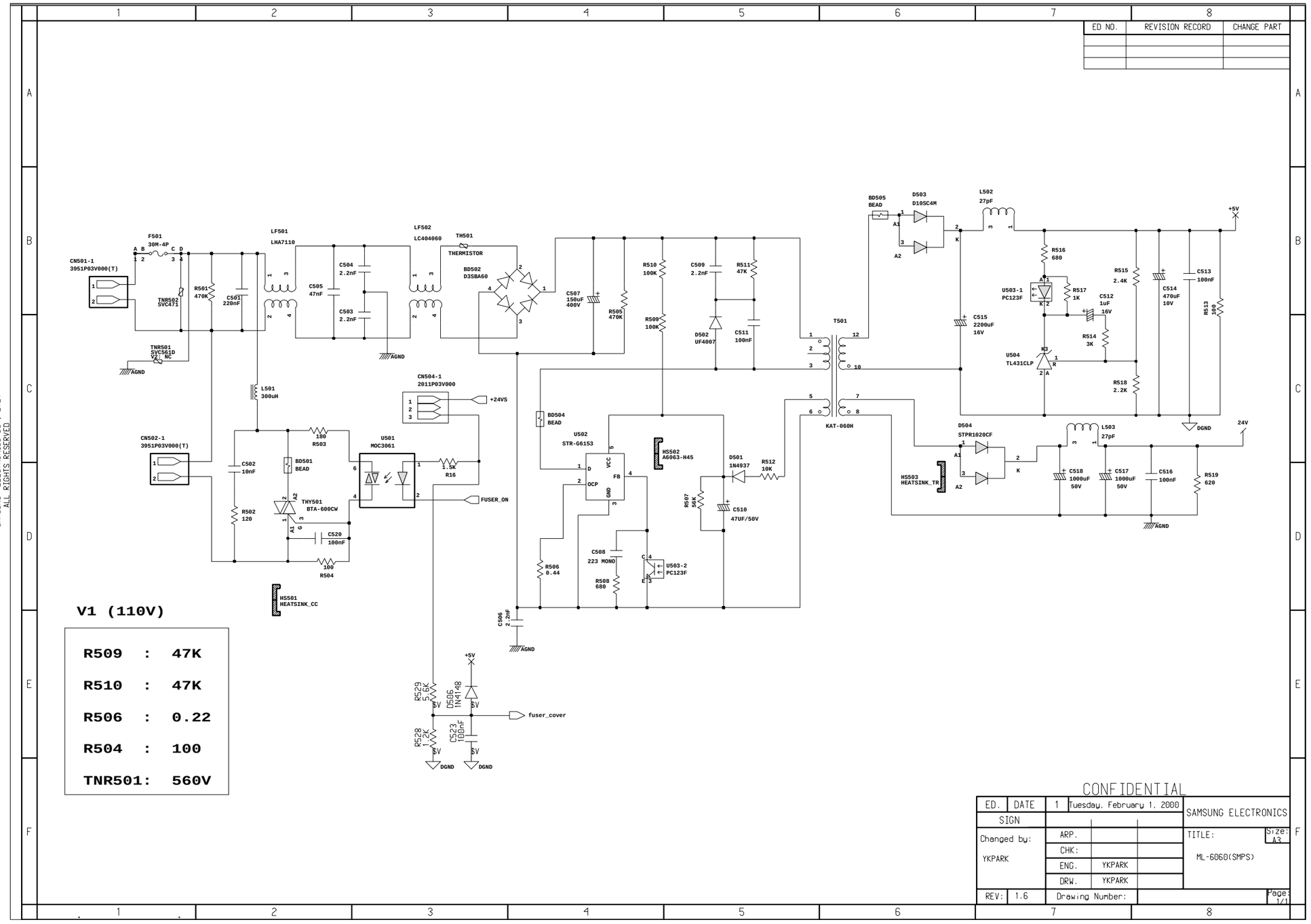
10-3 SMPS Circuit Diagram



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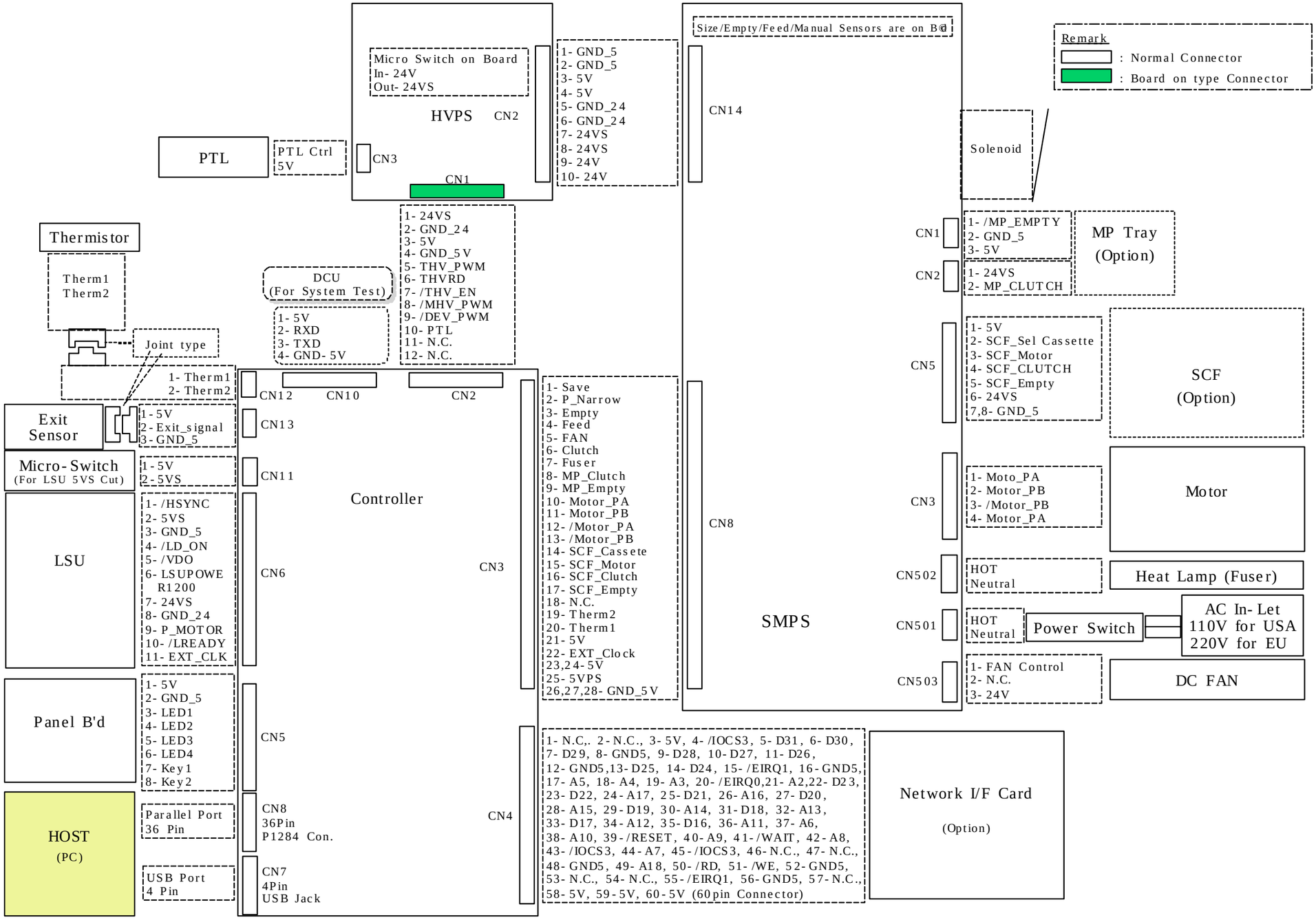
8. Connection Diagram



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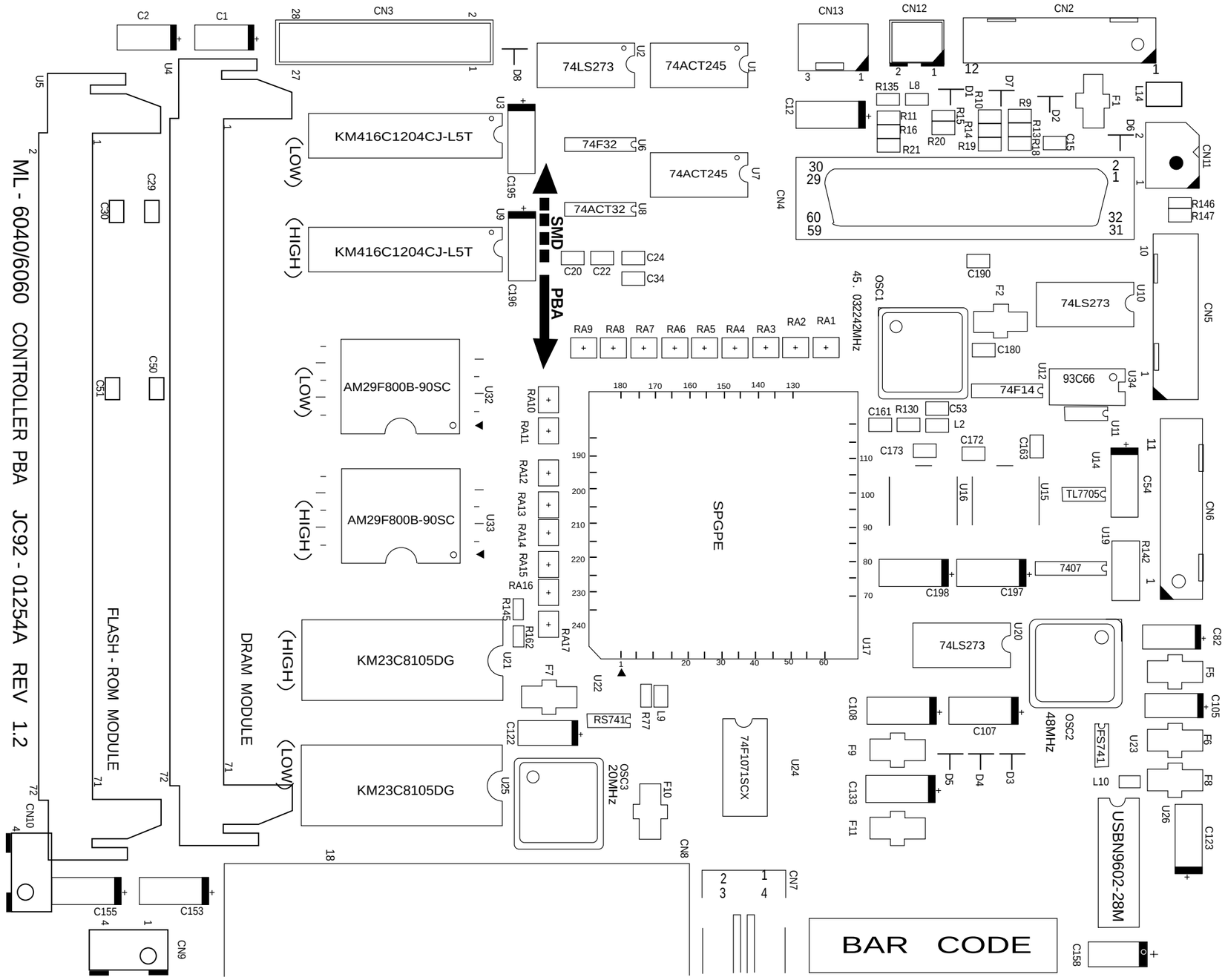
9. PCB Diagrams

9-1 Main PCB Diagram(TOP)



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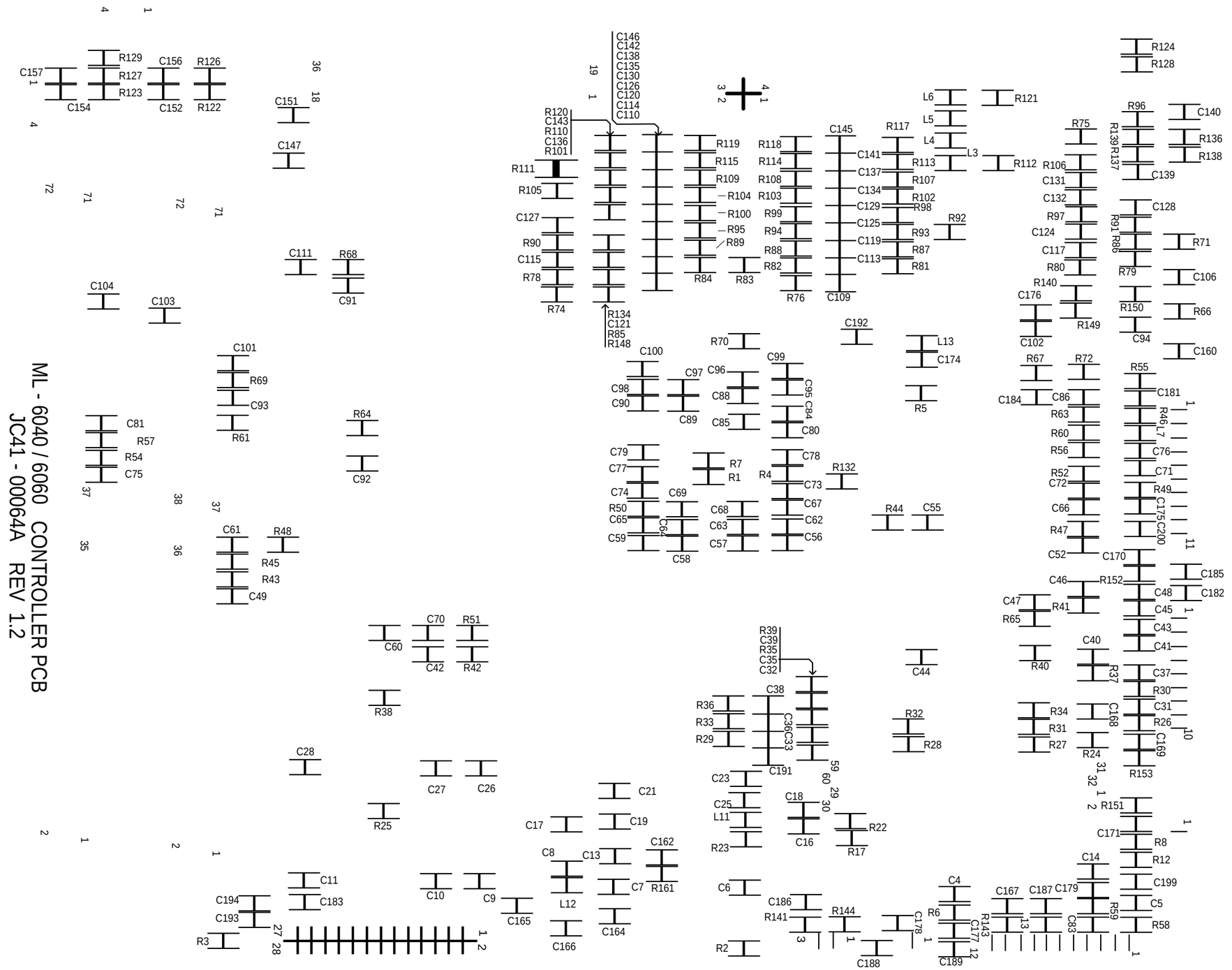
9-2 Main PCB Diagram(BOTTOM)



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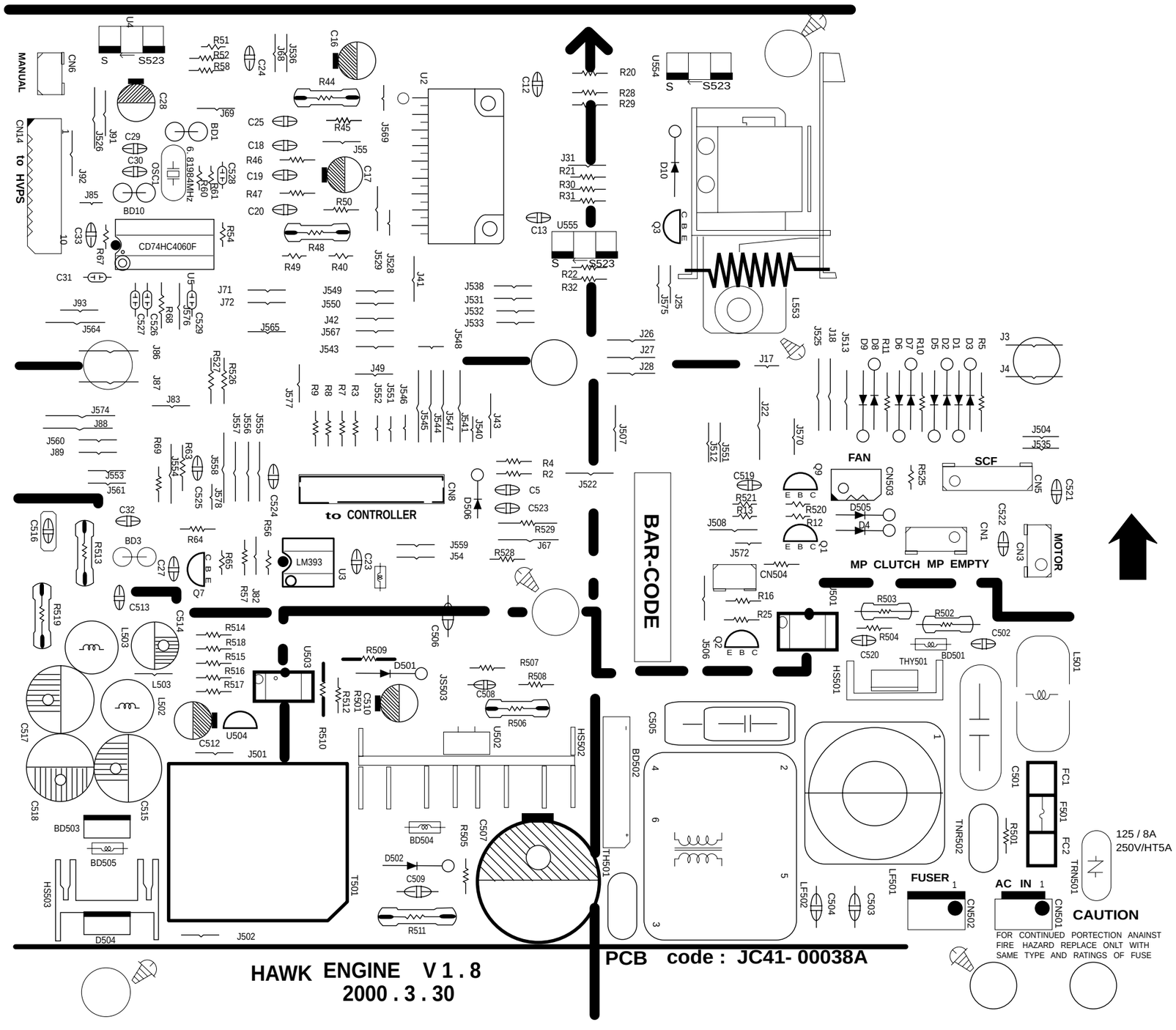
9-3 Engine PCB Diagram(TOP)



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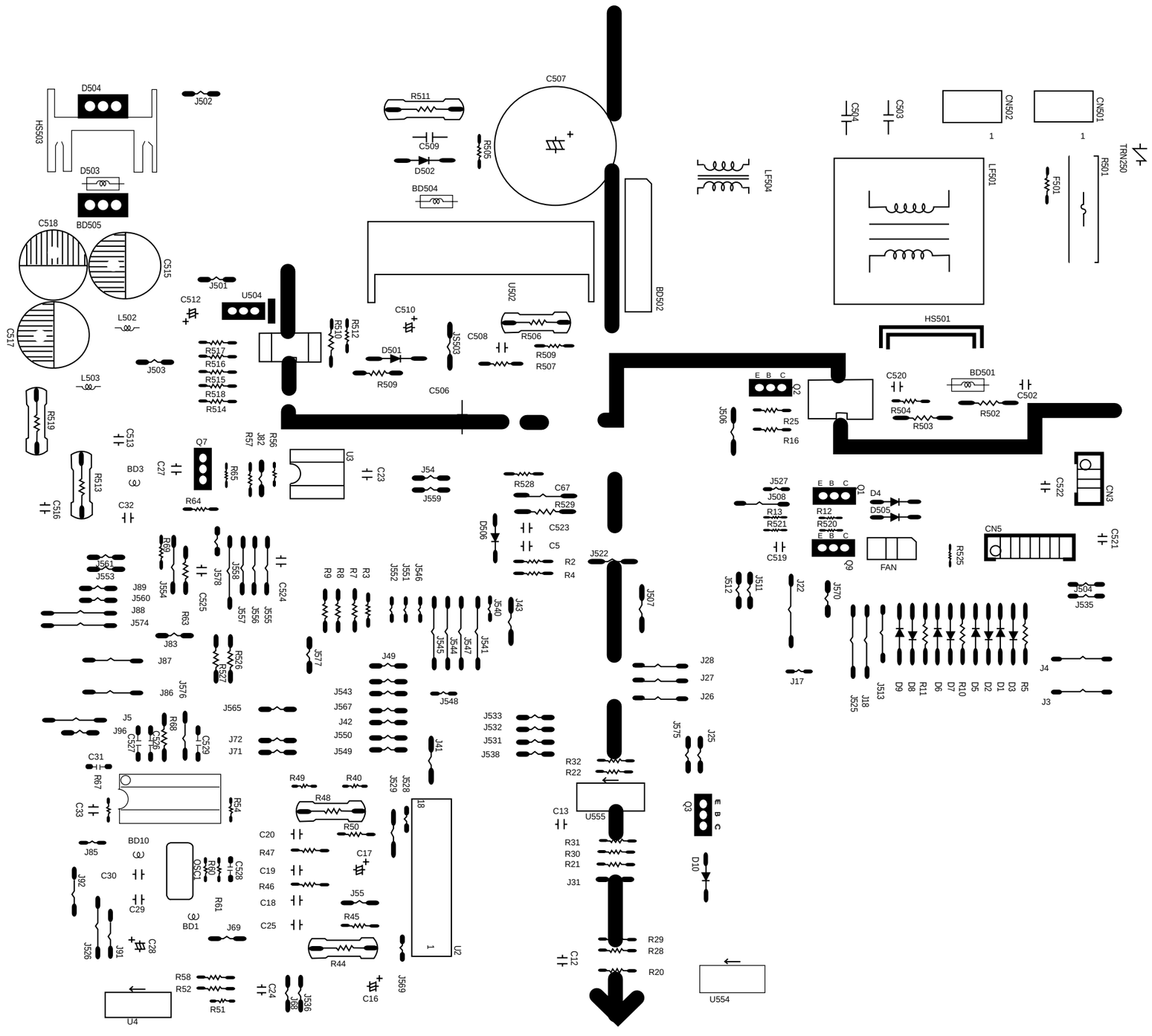
9-4 Engine PCB Diagram(BOTTOM)



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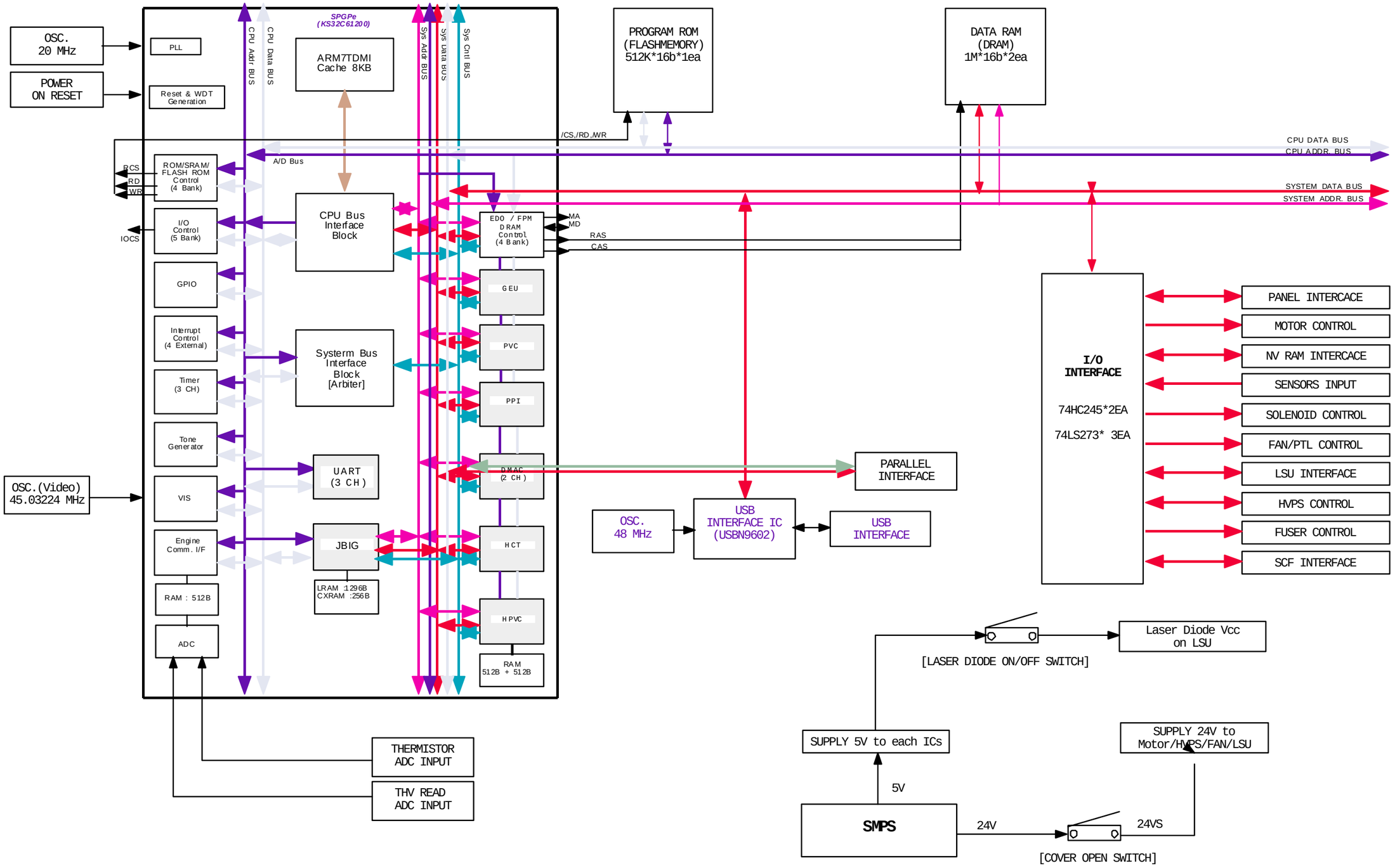
7. Block Diagram



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6. Electrical Parts Lists

6-1 Main PBA

SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION
JC92-01258A	**CONTROLLER PBA**	**1**	**PBA MAIN CTRL-LOW**
0105-001032	TEST PAPER	2	PAPER-ART "75g,W210,-,WHITE,HANSOI,L297"
0404-000112	"D2,D6"	2	DIODE-SCHOTTKY"RB420D,25V,100mA,SOT-23,TP"
0407-000101	"D1,D3,D4,D5,D7,D8"	6	DIODE-ARRAY "DA204K,20V,100mA,C2-3,SOT-23,T"
0801-001072	U8	1	IC-CMOS LOGIC"74ACT32,OR GATE,SOP,14P,150MIL"
0803-000118	U12	1	IC-TTL "74F14,INVERTER,SOP,14P,150MIL,"
0803-000275	U6	1	IC-TTL "74F32,OR GATE,SOP,14P,150MIL,Q"
0803-000468	"U2,U10,U20"	3	IC-TTL "74LS273,D FLIP-FLOP,SOP,20P,30"
0803-001393	U19	1	IC-TTL "7407,BUFFER/DRIVER,SOP,14P,150"
0803-003058	U24	1	IC-TTL "74F1071,ESD,SOP,20P,-,-,TP,PLA"
0904-001319	U26	1	IC-USC "USBN9602-28M,8BIT,SOP,28P,300MIL,48MHZ,ST,-, PLASTIC,3.3V,-,0TO+70C,-,-,-,-,-"
1006-000243	"U1,U7"	2	IC-LINE TRANSCEIVER"74ACT245,SOP,20P,-,OCTAL,ST,PL"
1103-000133	U11	1	IC-EEPROM "93C66,256x16BIT,SOP,8P,150MIL,"
1105-001213	U3	1	IC-DRAM "416C1204,1Mx16BIT,SOJ,42P,400M"
1107-001121	U33	1	IC-FLASH MEMORY "29F800,1Mx8/512Kx16Bit, TSOP,48P,787MIL,70nS,5V,10%,PLASTIC,0to+70C,100uA,CMOS,ST"
1203-000496	U14	1	IC-VOL. SUPERVISORY "7705,SOP,8P,150MIL,PLASTIC,20V"
1203-001026	"U15,U16"	2	IC-POSI.FIXED REG. "33269,DPAK,3P,265MIL,PLASTIC, 3.37/3.33V,-,-40TO+150C,800MA,-,ST"
2007-000029	"R136,R138,R152"	3	R-CHIP "0OHM,5%,1/10W,DA,TP,2012"
2007-000029	"R3,R4,R24,R26,R30,R37,R96"	7	R-CHIP "0OHM,5%,1/10W,DA,TP,2012"
2007-000221	R59	1	R-CHIP "1.2KOHM,5%,1/10W,DA,TP,2012"
2007-000241	R124	1	R-CHIP "1.5KOHM,5%,1/10W,DA,TP,2012"
2007-000290	"R28,R32,R76,R141,R143"	5	R-CHIP "100OHM,5%,1/10W,DA,TP,2012"
2007-000300	"R1,R5,R7,R8,R49,R52,R60,R63,R64"	9	R-CHIP "10KOHM,5%,1/10W,DA,TP,2012"
2007-000300	"R75,R146,R153"	3	R-CHIP "10KOHM,5%,1/10W,DA,TP,2012"
2007-000308	"R40,R50,R51,R66,R71,R74,R120"	7	R-CHIP "10OHM,5%,1/10W,DA,TP,2012"
2007-000312	R111	1	R-CHIP "10OHM,5%,1/8W,DA,TP,3216"
2007-000409	R144	1	R-CHIP "15KOHM,5%,1/10W,DA,TP,2012"
2007-000449	"R12,R147,R151"	3	R-CHIP "180OHM,5%,1/10W,DA,TP,2012"
2007-000468	R132	1	R-CHIP "1KOHM,5%,1/10W,DA,TP,2012"
2007-000468	"R41,R56,R78,R79,R81,R83,R84,R86,R87,R89"	10	R-CHIP "1KOHM,5%,1/10W,DA,TP,2012"
2007-000468	"R93,R95,R100,R104,R105,R109,R115,R119"	8	R-CHIP "1KOHM,5%,1/10W,DA,TP,2012"
2007-000493	"R90,R97"	2	R-CHIP "2.2KOHM,5%,1/10W,DA,TP,2012"
2007-000551	"R112,R121"	2	R-CHIP "20OHM,5%,1/10W,DA,TP,2012"
2007-000766	R77	1	R-CHIP "330OHM,5%,1/10W,DA,TP,2012"
2007-000774	"R6,R135"	2	R-CHIP "33KOHM,5%,1/10W,DA,TP,2012"
2007-000781	"R108,R114,R118"	3	R-CHIP "33OHM,5%,1/10W,DA,TP,2012"
2007-000781	"R19,R20,R21,R22,R23,R25,R27,R31,R34,R38"	10	R-CHIP "33OHM,5%,1/10W,DA,TP,2012"
2007-000781	"R2,R9,R10,R11,R13,R14,R15,R16,R17,R18"	10	R-CHIP "33OHM,5%,1/10W,DA,TP,2012"

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Main PBA

SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION
2007-000781	"R69,R70,R82,R88,R94,R99,R103,R106"	8	R-CHIP "33OHM,5%,1/10W,DA,TP,2012"
2007-000872	R134	1	R-CHIP "4.7KOHM,5%,1/10W,DA,TP,2012"
2007-000931	"R47,R92"	2	R-CHIP "470OHM,5%,1/10W,DA,TP,2012"
2007-000964	"R113,R117,R122,R126,R129,R130,R131"	7	R-CHIP "5.1KOHM,5%,1/10W,DA,TP,2012"
2007-000964	R162	1	R-CHIP "5.1KOHM,5%,1/10W,DA,TP,2012"
2007-000964	"R46,R55,R58,R65,R67,R72,R98,R102,R107"	9	R-CHIP "5.1KOHM,5%,1/10W,DA,TP,2012"
2007-001133	"R29,R33,R35,R36,R39,R42,R43,R44,R45,R54"	10	R-CHIP "68OHM,5%,1/10W,DA,TP,2012"
2007-001133	"R57,R68,R80,R110"	4	R-CHIP "68OHM,5%,1/10W,DA,TP,2012"
2007-001216	R91	1	R-CHIP "82OHM,5%,1/10W,DA,TP,2012"
2007-007961	R142	1	R-CHIP "1ohm,1%,1W,DA,TP,6432"
2011-001094	"RA1,RA2,RA3,RA4,RA5,RA6,RA7,RA8,RA9,RA10"	10	R-NETWORK "39ohm,5%,63mW,L,CHIP,8P,TP"
2011-001094	"RA11,RA12,RA13,RA14,RA15,RA16,RA17"	7	R-NETWORK "39ohm,5%,63mW,L,CHIP,8P,TP"
2203-000192	"C106,C121,C136,C140"	4	"C-CERAMIC,CHIP""100nF,+80-20%,50V,Y5V,TP,2012,"
2203-000192	"C172,C173,C176,C177,C178,C179"	6	"C-CERAMIC,CHIP" "100nF,+80-20%,50V,Y5V,TP,2012,"
2203-000192	"C19,C23,C24,C26,C27,C28,C32,C41"	8	"C-CERAMIC,CHIP" "100nF,+80-20%,50V,Y5V,TP,2012,"
2203-000192	"C44,C47,C52,C56,C57,C58,C59"	7	"C-CERAMIC,CHIP" "100nF,+80-20%,50V,Y5V,TP,2012,"
2203-000192	"C5,C6,C7,C9,C10,C11,C15,C16,C18"	9	"C-CERAMIC,CHIP" "100nF,+80-20%,50V,Y5V,TP,2012,"
2203-000192	"C62,C63,C64,C65,C67,C68,C69,C71,C72,C73"	10	"C-CERAMIC,CHIP" "100nF,+80-20%,50V,Y5V,TP,2012,"
2203-000192	"C77,C78,C79,C80,C84,C85,C86,C88,C89,C90"	10	"C-CERAMIC,CHIP" "100nF,+80-20%,50V,Y5V,TP,2012,"
2203-000192	"C92,C94,C95,C96,C97,C98,C99,C102"	8	"C-CERAMIC,CHIP" "100nF,+80-20%,50V,Y5V,TP,2012,"
2203-000239	"C13,C17,C20,C25,C74,C141,C174,C175"	8	"C-CERAMIC,CHIP" "0.1nF,5%,50V,NP0,TP,2012"
2203-000239	"C145,C152,C156,C164,C165,C166,C167"	7	"C-CERAMIC,CHIP" "0.1nF,5%,50V,NP0,TP,2012"
2203-000260	"C161,C162,C180,C181,C182,C183"	6	"C-CERAMIC,CHIP" "10nF,10%,50V,X7R,TP,2012"
2203-000389	"C53,C117,C143"	3	"C-CERAMIC,CHIP" "0.015nF,5%,50V,NP0,TP,2012"
2203-000455	"C160,C168,C169,C170,C171,C186"	6	"C-CERAMIC,CHIP" "1nF,5%,50V,NP0,TP,2012"
2203-000455	"C187,C188,C189,C190,C191,C192,C193,C194"	8	"C-CERAMIC,CHIP" "1nF,5%,50V,NP0,TP,2012"
2203-000455	"C4,C14,C31,C37,C40,C66,C83,C109,C151"	9	"C-CERAMIC,CHIP" "1nF,5%,50V,NP0,TP,2012"
2203-000595	"C114,C120,C126,C130,C135,C138,C142,C146"	8	"C-CERAMIC,CHIP" "0.22nF,5%,50V,NP0,TP,2012"
2203-000595	"C127,C132"	2	"C-CERAMIC,CHIP" "0.22nF,5%,50V,NP0,TP,2012"
2203-000634	"C101,C184"	2	"C-CERAMIC,CHIP" "0.022nF,5%,50V,NP0,TP,2012"
2203-000634	"C115,C124,C131"	3	"C-CERAMIC,CHIP" "0.022nF,5%,50V,NP0,TP,2012"
2203-000784	"C8,C22,C163"	3	"C-CERAMIC,CHIP" "0.33nF,5%,50V,NP0,TP,2012"
2203-000818	"C21,C33,C34,C35,C36,C38,C39,C43,C45,C46"	10	"C-CERAMIC,CHIP" "0.033nF,5%,50V,NP0,TP,2012"
2203-000818	"C48,C49,C61,C139"	4	"C-CERAMIC,CHIP" "0.033nF,5%,50V,NP0,TP,2012"
2203-000891	C76	1	"C-CERAMIC,CHIP" "4.7nF,10%,50V,X7R,TP,2012"
2203-000938	"C113,C119,C125,C129,C134,C137,C185"	7	"C-CERAMIC,CHIP" "0.47nF,5%,50V,NP0,TP,2012"
2203-001002	"C42,C70,C75,C81,C91,C110,C128"	7	"C-CERAMIC,CHIP" "0.047nF,5%,50V,NP0,TP,2012"
2203-001132	C100	1	"C-CERAMIC,CHIP" "0.68nF,5%,50V,NP0,TP,2012"
2203-001158	C55	1	"C-CERAMIC,CHIP" "0.068nF,5%,50V,NP0,TP,2012"
2402-000168	C87	1	"C-AL,SMD" "100uF,20%,16V,GP,TP,8.3x8.3x6.3mm"
2404-000128	"C1,C2,C82,C105,C122,C158"	6	"C-TA,CHIP" "10uF,20%,16V,-,TP,6032,-"
2404-000468	"C12,C54,C107,C108,C123,C133"	6	"C-TA,CHIP" "33uF,20%,16V,GP,TP,7343,-"
2804-001163	OSC3	1	OSCILLATOR-CLOCK"20MHz,50ppm,10TTL & CMOS,ST,5V"

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Main PBA

SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION
2804-001278	OSC2	1	OSCILLATOR-CLOCK "48MHZ,100PPM,10 TTL & CMOS,ST,5V,40MA"
2804-001348	OSC1	1	OSCILLATOR-CLOCK "45.032242MHz,100ppm,10TTL&CMOS,BK,5V,40mA"
2901-000229	"F1,F2,F5,F6,F7,F8,F9,F10"	8	FILTER-EMI SMD "50V,0.3A,-,22000pF,4.5x3.2x1.5mm,TP"
2901-000229	F11	1	FILTER-EMI SMD "50V,0.3A,-,22000pF,4.5x3.2x1.5mm,TP"
3301-000317	"L11,L12,L13"	3	CORE-FERRITE BEAD "AB,2x1.25x0.9mm,-,-"
3301-000317	"L2,L3,L4,L5,L6,L7,L8,L9,L10"	9	CORE-FERRITE BEAD "AB,2x1.25x0.9mm,-,-"
3702-000118	CN8	1	CONNECTOR-RIBBON "36P,FEMALE,ANGLE,AU"
3711-002811	CN5	1	CONNECTOR-HEADER "BOX,10P,1R,2mm,STRAIGHT,SN"
3711-002812	CN6	1	CONNECTOR-HEADER "BOX,11P,1R,2mm,STRAIGHT,SN"
3711-002813	CN2	1	CONNECTOR-HEADER "BOX,12P,1R,2mm,STRAIGHT,SN"
3711-003205	CN9	1	CONNECTOR-HEADER "BOX,4P,1R,2.0mm,STRAIGHT,SN"
3711-003408	CN12	1	CONNECTOR-HEADER "BOX,2P,1R,2mm,STRAIGHT,SN"
3711-003409	CN13	1	CONNECTOR-HEADER "BOX,3P,1R,2mm,STRAIGHT,SN"
3711-003969	CN11	1	CONNECTOR-HEADER "BOX,2P,1R,2.5mm,STRAIGHT,SN"
3711-003981	CN3	1	CONNECTOR-HEADER "BOX,28P,2R,2mm,STRAIGHT,SN"
3722-001101	CN7	1	JACK-USB "4P/2C,8.38mm,AU,IVR,#22-28"
4701-001020	"U22,U23"	2	FREQ-ATTENUATOR "5-80MHz,15dB,-,0.03W"
JC13-00006A	U17	1	IC ASIC- SPGPE+ "ML-6060,KS32C61200,QFP,240P,36.4x4"
JC41-00036A	HAWK CONTROLLER PCB	1	PCB-CTRL_6040A "ML-6040A,FR-4,4LAYER,1.6T,145X180MM"

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SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION
JC92-01187A			
0401-000005	"D1,2,3,5,6,7,8,9,506"	9	DIODE-SWITCHING "1N4148,100V,200MA,DO-35,TP"
0402-000012	D502	1	DIODE-RECTIFIER "UF4007,1KV,1A,DO-41,TP"
0402-000104	BD502	1	DIODE-BRIDGE "D3SBA60,600V,4A,-,ST"
0402-000129	"D4,D10,D505"	3	DIODE-RECTIFIER "1N4003,200V,1A,DO-41,TP"
0402-000314	D503	1	DIODE-RECTIFIER "D10SC4M,40V,10A,ITO-220"
0402-000351	D501	1	DIODE-RECTIFIER "1N4937,600V,1A,DO-41,TP"
0501-000010	"Q1,Q2,Q3,Q7,Q9"	5	TR-SMALL SIGNAL "KSC1008,NPN,800mW,TO-92,TP,120"
0604-000001	U503	1	PHOTO-COUPLER "TR,50-60%,200mW,DIP-4,ST"
0604-000146	U501	1	PHOTO-COUPLER "TRIAC,-,250mW,DIP-6,ST"
0604-001211	"U4,U554,U555"	3	PHOTO-INTERRUPTER "TR,-,200mW,DIP-4,ST"
0801-001262	U5	1	IC-CMOS LOGIC "74HC4060,BINARY COUNTER,DIP,16"
1003-001291	U2	1	IC-MOTOR DRIVER "A2918SWH,DIP,18P,1220MIL,-,+-1.5A,ST,PLASTIC,-,-20to+85C,20W,45V,-"
1202-000103	U3	1	IC-VOLTAGE COMP. "393,DIP,8P,300MIL,DUAL,36V,CMO"
1203-000002	U504	1	IC-POSI.ADJUST REG. "431,TO-92,3P,-,PLASTIC,2.44/2."
1404-000167	TH501	1	THERMISTOR-NTC "5ohm,10%,3150K,18.7mW/C,TP"
1405-000125	TNR502	1	VARISTOR "220V,4500A,17x4.2mm,TP"
1405-000147	TNR501	1	VARISTOR "470V,4500A,17x12mm,BK"
2001-000021	R512	1	R-CARBON "27OHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000027	R504	1	R-CARBON "100OHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000045	R63	1	R-CARBON "1.8KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000058	R529	1	R-CARBON "5.6KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000071	R507	1	R-CARBON "22KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000105	"R16,R528"	2	R-CARBON "1.5KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000119	R516	1	R-CARBON "680OHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000281	"R2,3,7,8,9,20,21,54,58,61"	10	R-CARBON "100OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000281	R527	1	R-CARBON "100OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000290	R49	1	R-CARBON "10KOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000362	"R29,R31,R51,R525"	4	R-CARBON "150OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000429	"R25,R45,R50,R56"	4	R-CARBON "1KOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000435	R60	1	R-CARBON "1MOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000436	J555	1	R-CARBON "0OHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000537	"R46,R47"	2	R-CARBON "24KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000588	R514	1	R-CARBON "3.3KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000613	R65	1	R-CARBON "3.9KOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000793	R68	1	R-CARBON "47OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000812	"R5,10,11,12,22,64,67,520"	8	R-CARBON "5.6KOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000832	"R13,R32,R521"	3	R-CARBON "510OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000876	R57	1	R-CARBON "6.2KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-001150	"R501,R505"	2	R-CARBON(S) "470KOHM,5%,1/2W,AA,TP,2.4X6.4MM"
2003-000455	R513	1	R-METAL OXIDE(S) "100ohm,5%,2W,AA,TP,4x12mm"
2003-000706	R511	1	R-METAL OXIDE(S) "47Kohm,5%,2W,AA,TP,4.3x12mm"
2003-000767	R519	1	R-METAL OXIDE(S) "680ohm,5%,2W,AA,TP,4x12mm"

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SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION
2003-002190	"R509,R510"	2	R-METAL OXIDE(S) "47Kohm,5%,1W,T,TP,2.6x6.0mm"
2004-000345	"R4,R28,R30,R52,R526"	5	R-METAL "15Kohm,1%,1/8W,AA,TP,1.8x3.2mm"
2004-000432	R517	1	R-METAL "1Kohm,1%,1/4W,AA,TP,2.4x6.4mm"
2004-000481	R515	1	R-METAL "2.4Kohm,1%,1/4W,AA,TP,2.4x6.4m"
2004-000699	"R40,R69"	2	R-METAL "3.3Kohm,1%,1/8W,AA,TP,1.8x3.2m"
2004-004006	R518	1	R-METAL "2.3Kohm,1%,1/4W,AA,TP,2.4x6.4m"
2005-000168	R506	1	"R-WIRE WOUND,NON""0.22ohm,5%,2W,AA,BK,4x12mm"
2005-001058	"R44,R48"	2	R-WIRE WOUND "0.39ohm,1%,1W,AA,TP,4.3x12mm"
2008-001071	R503	1	R-FUSIBLE(S) "180ohm,5%,1W,AA,TP,3.3x9.0mm"
2008-001072	R502	1	R-FUSIBLE(S) "120ohm,5%,1W,AA,TP,3.3x9mm"
2201-000017	"C20,C25,C27,C32"	4	"C-CERAMIC,DISC" "1nF,10%,50V,Y5P,TP,5x3.5,5"
2201-000019	"C24,C502"	2	"C-CERAMIC,DISC" "10nF,+80-20%,500V,Y5V,TP,13.5x4mm,5"
2201-000119	"C5,12,13,23,33,508,513,519,520"	9	"C-CERAMIC,DISC" "100nF,+80-20%,50V,Y5V,TP,8x3,5"
2201-000119	"C523,C524,C525"	3	"C-CERAMIC,DISC" "100nF,+80-20%,50V,Y5V,TP,8x3,5"
2201-000391	"C29,C30"	2	"C-CERAMIC,DISC" "0.022nF,5%,50V,SL,TP,5x3,5"
2201-000469	"C18,C19,C521,C522"	4	"C-CERAMIC,DISC" "0.33nF,10%,500V,Y5P,TP,5.5x3,5"
2201-002071	"C503,C504,C506"	3	"C-CERAMIC,DISC" "2.2nF,20%,400V,Y5U,TP,12x7,10"
2202-000121	"C31,526,527,528,529"	5	"C-CERAMIC,MLC-AXIAL""100pF,10%,50V,Y5P,TP,1.9x3.5,-"
2301-000010	C516	1	"C-FILM,PEF" "100nF,5%,100V,TP,11.5x12.5mm,5"
2301-000323	"C501,C505"	2	"C-FILM,PEF" "220NF,20%,275V,TP,18X8.5X26MM,22.5"
2301-001340	C509	1	"C-FILM,MPPF" "10nF,10%,630V,TP,16x5.5x10.5mm,7.5"
2401-000183	"C517,C518"	2	C-AL "1000uF,20%,35V,WT,TP,12.5x25,5"
2401-000603	C512	1	C-AL "1uF,20%,50V,GP,TP,5x11,5"
2401-000698	C515	1	C-AL "2200uF,20%,16V,WT,TP,12.5x25,5"
2401-001197	C510	1	C-AL "33uF,20%,50V,GP,TP,6.3x7,-"
2401-001695	C507	1	C-AL "220uF,20%,200V,WT,BK,22x25,10"
2401-002144	C17	1	C-AL "47uF,20%,16V,GP,TP,5x11,5"
2401-002300	"C16,C28"	2	C-AL "47uF,20%,50V,GP,TP,6.3x11,5"
2401-002420	C514	1	C-AL "470uF,20%,16V,GP,TP,10x12,5mm"
2801-003885	OSC1	1	CRYSTAL-UNIT "6.81984MHz,30ppm,28-AAM,20pF,75ohm,TP"
3301-000344	"BD1,BD3,BD10"	3	CORE-FERRITE BEAD "AA,-,3.5x0.6x6.5mm,-,-,Mn-Zn,-"
3301-001015	"BD504,JS503"	2	CORE-FERRITE BEAD "AA,70ohm,3.6x0.65x5mm,7000mA,TP,FERRITE,0.01ohm"
3601-000157	F501	1	FUSE-CARTRIDGE "125V,8A,SLOW-BLOW,GLASS,5.2x20mm"
3602-000001	"FC1,FC2"	2	FUSE-CLIP "-,-,30mohm"
3711-000028	CN3	1	CONNECTOR-HEADER "BOX,4P,1R,2mm,STRAIGHT,SN"
3711-000217	CN501	1	CONNECTOR-HEADER "1WALL,3P,1R,3.96mm,STRAIGHT,SN"
3711-002806	CN1	1	CONNECTOR-HEADER "BOX,5P,1R,2mm,STRAIGHT,SN"
3711-002809	CN5	1	CONNECTOR-HEADER "BOX,8P,1R,2mm,STRAIGHT,SN"
3711-003359	CN14	1	CONNECTOR-HEADER "BOX,10P,1R,2.5mm,STRAIGHT,SN"
3711-003409	"CN6,CN504"	2	CONNECTOR-HEADER "BOX,3P,1R,2mm,STRAIGHT,SN"
3711-003968	CN503	1	CONNECTOR-HEADER "BOX,3P,1R,2.5mm,STRAIGHT,SN"
3711-003981	CN8	1	CONNECTOR-HEADER "BOX,28P,2R,2mm,STRAIGHT,SN"

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SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION
3711-004443	CN502	1	CONNECTOR-HEADER "1WALL,2P,1R,7.92mm,STRAIGHT,SN"
JC26-00002A	T501	1	TRANS POWER-SW_V1"ML-5200A,110V,-"
JC27-00001A	LF501	1	COIL FILTER-SQ2828 "ML-5200A,18.0mH,0.20ohm,58T"
JC27-00002A	LF502	1	COIL FILTER-SQ2116 "ML-5200A,4.8mH,0.43ohm,45T"
JC27-60101A	L501	1	COIL FILTER- "-,300UH,-,-"
JC27-60101B	L503	1	COIL FILTER- "-,9UH,-,-"
JC27-60101C	L502	1	COIL FILTER- "-,6UH,-,-"
JC33-10501B	L553	1	SOLENOID-6000 "ML-6000,24VDC,72W,57,39X39X22,"
JC39-40511A	"BD501,BD505,R508"	3	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J3,4,17,18,22,25,26,27,28,31"	10	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J41,J42,J43,J49,J54,J55,	10	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J67,J68,J69,J71"	10	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J501~J508"	7	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J511,J512,J513"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J522,J525,J526"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J528,J529,J531"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J532,J533,J535,J536,J538"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J540,J541,J543,J544"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J545~J552"	8	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J553~J560"	8	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J561,J565,J574~J578"	7	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J72,J82,J83,J85~J89,J91,J92"	10	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J93,J564,J567,J569,J570,J572"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC41-00038A	PCB-HAWK ENGINE	1	PCB-HAWK ENGINE "ML-6040A,FR-1,1LAYER,1.6T,246.5x213.5mm"
JC96-01935A		1	ELA UNIT-HEAT-SINK (1020CF) "ML-5000A,SAMSUNG,KOREA,-,-,-,-"
0402-000304		1	DIODE-RECTIFIER "STPR1020CF,200V,5A,TO-220,ST"
6003-000119		1	SCREW-TAPTITE "BH,+,B,M3,L8,CBLACK,SWRCH18A"
JC62-30908A		1	HEAT SINK-SMPS"ML-5000,AL,ANODIZING"
JC96-01936A		1	ELA UNIT-HEAT-SINK (6060) "ML-5000A,SAMSUNG,KOREA,-,-,-,-"
1203-001721		1	IC-PWM CONTROLLER
			"STR-G6153T,T0-220,5P,140MIL,PLASTIC,-,1.5W NO HEATSINK,-20TO +120C,8A,-,ST"
6003-000119		1	SCREW-TAPTITE "BH,+,B,M3,L8,CBLACK,SWRCH18A"
JC62-00001A		1	HEAT SINK-FET "ML-6060,A6063,SILVER"
JC96-01946A		1	ELA UNIT-HEAT-SINK (600CW) "ML-5000A,SAMSUNG,KOREA,-,-,-,-"
1401-000108		1	THYRISTOR-TRIAC "100A,600V,-,5V/uS,TO-220AB"
6003-000269		1	SCREW-TAPTITE "BH,+,S,M3,L6,ZPC(YEL),SWRCH18A"
JF62-30201A		1	HEAT SINK "HVPS,SPCC,t1.0"

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SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION	
JC92-01190A				
0401-000005	"D1~D3,D5~D9,D506"	9	DIODE-SWITCHING	"1N4148,100V,200MA,DO-35,TP"
0402-000012	D502	1	DIODE-RECTIFIER	"UF4007,1KV,1A,DO-41,TP"
0402-000104	BD502	1	DIODE-BRIDGE	"D3SBA60,600V,4A,-,ST"
0402-000129	"D4,D10,D505"	3	DIODE-RECTIFIER	"1N4003,200V,1A,DO-41,TP"
0402-000314	D503	1	DIODE-RECTIFIER	"D10SC4M,40V,10A,ITO-220"
0402-000351	D501	1	DIODE-RECTIFIER	"1N4937,600V,1A,DO-41,TP"
0501-000010	"Q1,Q2,Q3,Q7,Q9"	5	TR-SMALL SIGNAL	"KSC1008,NPN,800mW,TO-92,TP,120"
0604-000142	U503	1	PHOTO-COUPLER	"TR,-,200mW,DIP-4,ST"
0604-000146	U501	1	PHOTO-COUPLER	"TRIAC,-,250mW,DIP-6,ST"
0604-001211	"U4,U554,U555"	3	PHOTO-INTERRUPTER	"TR,-,200mW,DIP-4,ST"
0801-001262	U5	1	IC-CMOS LOGIC	"74HC4060,BINARY COUNTER,DIP,16"
1003-001291	U2	1	IC-MOTOR DRIVER	
			"A2918SWH,DIP,18P,1220MIL,-,+-1.5A,ST,PLASTIC,-,-20to+85C,20W,45V,-"	
1202-000103	U3	1	IC-VOLTAGE COMP.	"393,DIP,8P,300MIL,DUAL,36V,CMO"
1203-000002	U504	1	IC-POSI.ADJUST REG.	"431,TO-92,3P,-,PLASTIC,2.44/2."
1404-000167	TH501	1	THERMISTOR-NTC	"5ohm,10%,3150K,18.7mW/C,TP"
1405-000147	TNR502	1	VARISTOR	"470V,4500A,17x12mm,BK"
2001-000021	R512	1	R-CARBON	"27OHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000045	R63	1	R-CARBON	"1.8KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000058	R529	1	R-CARBON	"5.6KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000071	R507	1	R-CARBON	"22KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000105	"R16,R528"	2	R-CARBON	"1.5KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000119	R516	1	R-CARBON	"680OHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000281	"R2,R3,R7,R8,R9,R20,R21"	10	R-CARBON	"100OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000281	R527,R54,R58,R61	1	R-CARBON	"100OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000290	R49	1	R-CARBON	"10KOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000362	"R29,R31,R51,R525"	4	R-CARBON	"150OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000429	"R25,R45,R50,R56"	4	R-CARBON	"1KOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000435	R60	1	R-CARBON	"1MOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000436	J555	1	R-CARBON	"0OHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000525	R504	1	R-CARBON	"22OHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000537	"R46,R47"	2	R-CARBON	"24KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000588	R514	1	R-CARBON	"3.3KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-000613	R65	1	R-CARBON	"3.9KOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000793	R68	1	R-CARBON	"47OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000812	"R5,10,11,12,22,64,67,520"	8	R-CARBON	"5.6KOHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000832	"R13,R32,R521"	3	R-CARBON	"510OHM,5%,1/8W,AA,TP,1.8X3.2MM"
2001-000876	R57	1	R-CARBON	"6.2KOHM,5%,1/4W,AA,TP,2.4X6.4MM"
2001-001150	"R501,R505"	2	R-CARBON(S)	"470KOHM,5%,1/2W,AA,TP,2.4X6.4MM"
2003-000455	R513	1	R-METAL OXIDE(S)	"100ohm,5%,2W,AA,TP,4x12mm"
2003-000706	R511	1	R-METAL OXIDE(S)	"47Kohm,5%,2W,AA,TP,4.3x12mm"
2003-000767	R519	1	R-METAL OXIDE(S)	"680ohm,5%,2W,AA,TP,4x12mm"

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Engine PBA(220V)

SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION
2003-002123	"R509,R510"	2	R-METAL OXIDE(S) "100Kohm,5%,1W,AA,TP,2.5x6.5mm"
2004-000345	"R4,R28,R30,R52,R526"	5	R-METAL "15Kohm,1%,1/8W,AA,TP,1.8x3.2mm"
2004-000432	R517	1	R-METAL "1Kohm,1%,1/4W,AA,TP,2.4x6.4mm"
2004-000481	R515	1	R-METAL "2.4Kohm,1%,1/4W,AA,TP,2.4x6.4m"
2004-000699	"R40,R69"	2	R-METAL "3.3Kohm,1%,1/8W,AA,TP,1.8x3.2m"
2004-004006	R518	1	R-METAL "2.3Kohm,1%,1/4W,AA,TP,2.4x6.4m"
2005-001058	"R44,R48"	2	R-WIRE WOUND "0.39ohm,1%,1W,AA,TP,4.3x12mm"
2005-001114	R506	1	"R-WIRE WOUND,NON""0.44ohm,5%,2W,AA,TP,3.8x11mm"
2008-001071	R503	1	R-FUSIBLE(S) "180ohm,5%,1W,AA,TP,3.3x9.0mm"
2008-001072	R502	1	R-FUSIBLE(S) "120ohm,5%,1W,AA,TP,3.3x9mm"
2201-000017	"C20,C25,C27,C32"	4	"C-CERAMIC,DISC" "1nF,10%,50V,Y5P,TP,5x3.5,5"
2201-000019	"C24,C502,C513,C519,C520"	2	"C-CERAMIC,DISC" "10nF,+80-20%,500V,Y5V,TP,13.5x4mm,5"
2201-000119	"C5,C12,C13,C23,C33,C508"	9	"C-CERAMIC,DISC" "100nF,+80-20%,50V,Y5V,TP,8x3,5"
2201-000119	"C523,C524,C525"	3	"C-CERAMIC,DISC" "100nF,+80-20%,50V,Y5V,TP,8x3,5"
2201-000391	"C29,C30"	2	"C-CERAMIC,DISC" "0.022nF,5%,50V,SL,TP,5x3,5"
2201-000469	"C18,C19,C521,C522"	4	"C-CERAMIC,DISC" "0.33nF,10%,500V,Y5P,TP,5.5x3,5"
2201-002071	"C503,C504,C506"	3	"C-CERAMIC,DISC" "2.2nF,20%,400V,Y5U,TP,12x7,10"
2202-000121	"C31,C526,C527,C528,C529"	5	"C-CERAMIC,MLC-AXIAL""100pF,10%,50V,Y5P,TP,1.9x3.5,-"
2301-000010	C516	1	"C-FILM,PEF" "100nF,5%,100V,TP,11.5x12.5mm,5"
2301-000323	"C501,C505"	2	"C-FILM,PEF" "220NF,20%,275V,TP,18X8.5X26MM,22.5"
2301-001340	C509	1	"C-FILM,MPPF" "10nF,10%,630V,TP,16x5.5x10.5mm,7.5"
2401-000183	"C517,C518"	2	C-AL "1000uF,20%,35V,WT,TP,12.5x25,5"
2401-000532	C507	1	C-AL "150uF,20%,400V,GP,BK,22x35,10"
2401-000603	C512	1	C-AL "1uF,20%,50V,GP,TP,5x11,5"
2401-000698	C515	1	C-AL "2200uF,20%,16V,WT,TP,12.5x25,5"
2401-001197	C510	1	C-AL "33uF,20%,50V,GP,TP,6.3x7,-"
2401-002144	C17	1	C-AL "47uF,20%,16V,GP,TP,5x11,5"
2401-002300	"C16,C28"	2	C-AL "47uF,20%,50V,GP,TP,6.3x11,5"
2401-002420	C514	1	C-AL "470uF,20%,16V,GP,TP,10x12,5mm"
2801-003885	OSC1	1	CRYSTAL-UNIT "6.81984MHz,30ppm,28-AAM,20pF,75ohm,TP"
3301-000344	"BD1,BD3,BD10"	3	CORE-FERRITE BEAD "AA,-,3.5x0.6x6.5mm,-,-,Mn-Zn,-"
3301-001015	"BD504,JS503"	2	CORE-FERRITE BEAD "AA,70ohm,3.6x0.65x5mm,7000mA,TP,FERRITE,0.01ohm"
3601-000296	F501	1	FUSE-CARTRIDGE "250V,5A,TIME-LAG,CERAMIC,5.2x20mm"
3602-000001	"FC1,FC2"	2	FUSE-CLIP "-,-,30mohm"
3711-000028	CN3	1	CONNECTOR-HEADER"BOX,4P,1R,2mm,STRAIGHT,SN"
3711-000217	CN501	1	CONNECTOR-HEADER"1WALL,3P,1R,3.96mm,STRAIGHT,SN"
3711-002806	CN1	1	CONNECTOR-HEADER"BOX,5P,1R,2mm,STRAIGHT,SN"
3711-002809	CN5	1	CONNECTOR-HEADER"BOX,8P,1R,2mm,STRAIGHT,SN"
3711-003359	CN14	1	CONNECTOR-HEADER"BOX,10P,1R,2.5mm,STRAIGHT,SN"
3711-003409	"CN6,CN504"	2	CONNECTOR-HEADER"BOX,3P,1R,2mm,STRAIGHT,SN"
3711-003968	CN503	1	CONNECTOR-HEADER"BOX,3P,1R,2.5mm,STRAIGHT,SN"
3711-003981	CN8	1	CONNECTOR-HEADER"BOX,28P,2R,2mm,STRAIGHT,SN"
3711-004443	CN502	1	CONNECTOR-HEADER"1WALL,2P,1R,7.92mm,STRAIGHT,SN"

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Engine PBA(220V)

SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION
JC26-00003A	T501	1	TRANS POWER-SW_V2"ML-5200A,220V,-"
JC27-00001A	LF501	1	COIL FILTER-SQ2828 "ML-5200A,18.0mH,0.20ohm,58T"
JC27-00002A	LF502	1	COIL FILTER-SQ2116 "ML-5200A,4.8mH,0.43ohm,45T"
JC27-60101A	L501	1	COIL FILTER- "-,300UH,-,-"
JC27-60101B	L503	1	COIL FILTER- "-,9UH,-,-"
JC27-60101C	L502	1	COIL FILTER- "-,6UH,-,-"
JC33-10501B	L553	1	SOLENOID-6000 "ML-6000,24VDC,72W,57,39X39X22,"
JC39-40511A	"BD501,BD505,R508"	3	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J3,J4,J17,J18,J22"	3	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J25,J26,J27,J28,J31"	10	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J41,J42,J43,J49,J54"	10	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J55,J67,J68,J69,J71"	10	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J501~J509"	8	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J511,J512,J513,J522,J525,J526"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J528,J529,J531,J532,J533,J535"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J536,J538,J540,J541"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J543,J544,J564"	7	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J545~J552"	8	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J553,J554,J556~J560"	7	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J561,J567,J570,J572,J574,J575"	6	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J72,J82,J83,J85,J86"	8	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J87,J88,J89,J91,J92"	10	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC39-40511A	"J93,J565,J576,J577,J578"	5	CBF HARNESS- "ML-80,JUMPER,AWG22,52mm,SILVER"
JC41-00038A	PCB-HAWK ENGINE	1	PCB-HAWK ENGINE "ML-6040A,FR-1,1LAYER,1.6T,246.5x213.5mm"
JC96-01935A		1	ELA UNIT-HEAT-SINK (1020CF)"ML-5000A,SAMSUNG,KOREA,-,-,-,-"
0402-000304		1	DIODE-RECTIFIER "STPR1020CF,200V,5A,TO-220,ST"
6003-000119		1	SCREW-TAPTITE "BH,+,B,M3,L8,CBLACK,SWRCH18A"
JC62-30908A		1	HEAT SINK-SMPS "ML-5000,AL,ANODIZING"
JC96-01936A		1	ELA UNIT-HEAT-SINK (6060)"ML-5000A,SAMSUNG,KOREA,-,-,-,-"
1203-001721		1	IC-PWM CONTROLLER
			"STR-G6153T,T0-220,5P,140MIL,PLASTIC,-,1.5W NO HEATSINK,-20TO +120C,8A,-,ST"
6003-000119		1	SCREW-TAPTITE "BH,+,B,M3,L8,CBLACK,SWRCH18A"
JC62-00001A		1	HEAT SINK-FET "ML-6060,A6063,SILVER"
JC96-01946A		1	ELA UNIT-HEAT-SINK (600CW)"ML-5000A,SAMSUNG,KOREA,-,-,-,-"
1401-000108		1	THYRISTOR-TRIAC "100A,600V,-,5V/uS,TO-220AB"
6003-000269		1	SCREW-TAPTITE "BH,+,S,M3,L6,ZPC(YEL),SWRCH18A"
JF62-30201A		1	HEAT SINK "HVPS,SPCC,t1.0"

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6-4 Others

SEC CODE	LOCATION NO.	Q'ty	DESCRIPTION	
			PBA SUB-PANEL_II	
0601-000161	"LED1,LED5"	2	LED	"ROUND,GRN,5mm,563nm"
0601-000255	LED4	1	LED	"ROUND,RED,5mm,700nm"
0601-000304	"LED2,LED3"	2	LED	"ROUND,YEL,5mm,585nm"
2001-000111	"R1,R2,R3,R4,R5"	5	R-CARBON	"150OHM,5%,1/4W,AA,TP,2.4X6.4MM"
2201-000119	C1	1	"C-CERAMIC,DISC"	"100nF,+80-20%,50V,Y5V,TP,8x3,5"
3404-000155	"SW1,SW2,SW3"	3	SWITCH-TACT	"12V,50mA,160gf,6x6x3.5mm,SPST"
JC39-00072A	HAWK PANEL HARN 10P	1	CBF HARNESS-HVPS_CONTROL	
			"ML-6060,WIRE HARNESS,UL1061,50mm,BLK+RED,#26"	
JC41-00042B	HAWK PANEL_II PCB	1	PCB-HAWK PANEL_II	"ML-6060,FR-1,1LAYER,1.6T,107.5x40.1mm"
			PBA SUB-EXIT SENSOR	
0604-001033		1	PHOTO-INTERRUPTER	"TR,-,150mW,DIP-4,ST"
2001-000362		1	R-CARBON	"150OHM,5%,1/8W,AA,TP,1.8X3.2MM"
JC39-00071A	EXIT SENSOR HARN	1	CBF HARNESS-EXIT SENSOR	-
			"ML6060,WIRE HARNESS,UL1061,425mm,BK+RD+WH,#26"	
JC41-00050A	PCB-EXIT SENSOR	1	PCB SUB-EXIT SENSOR	"ML-6060,FR-1,1LAYER,1.6T,11.1x42.5mm"
JC92-01261B			**PBA SUB-FUSER_SW**	
JC39-00077A	HARN-FUSER SWITCH 3P	1	CBF HARNESS-MP_CLUTCH	
			"ML-6060,WIRE HARNESS,UL1061,150mm,BLK,#26"	
JC41-00068A	PCB-FUSER SWITCH	1	PCB SUB-FUSER_SWITCH	"ML-6060,FR-1,1LAYER,1.6T,19.5x22mm"
JC92-01235A	PBA-SENSOR DEVE	1	PBA SUB-SWITCH	"ML-6060,SEC,USA/EU,-,-,-,-"
3405-000125		1	SWITCH-MICRO	"125V,5A,50gf,SPDT"
JC39-00083A	DEVE CHECK SENSOR HARN	1	CBF HARNESS-SWITCH_SENSOR	
			"ML-6060,WIRE HARNESS,UL1061,150mm,BLK+RED,#26"	
JC41-00051A	PCB-DEVE CHECK SENSOR	1	PCB SUB-SWITCH	"ML-6060,FR-1,1LAYER,1.6T,8x21.7mm"

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5. Exploded Views and Parts List

5-1 Main Exploded View & Parts List

5-2 Cover Exploded View & Parts List

5-3 Frame Exploded View & Parts List

5-4 Exit Exploded View & Parts List

5-5 Fuser Exploded View & Parts List

5-6 Rack-MPF Exploded View & Parts List

5-7 Drive Exploded View & Parts List

5-8 Pick-Up Exploded View & Parts List

5-9 Cassette Exploded View & Parts List

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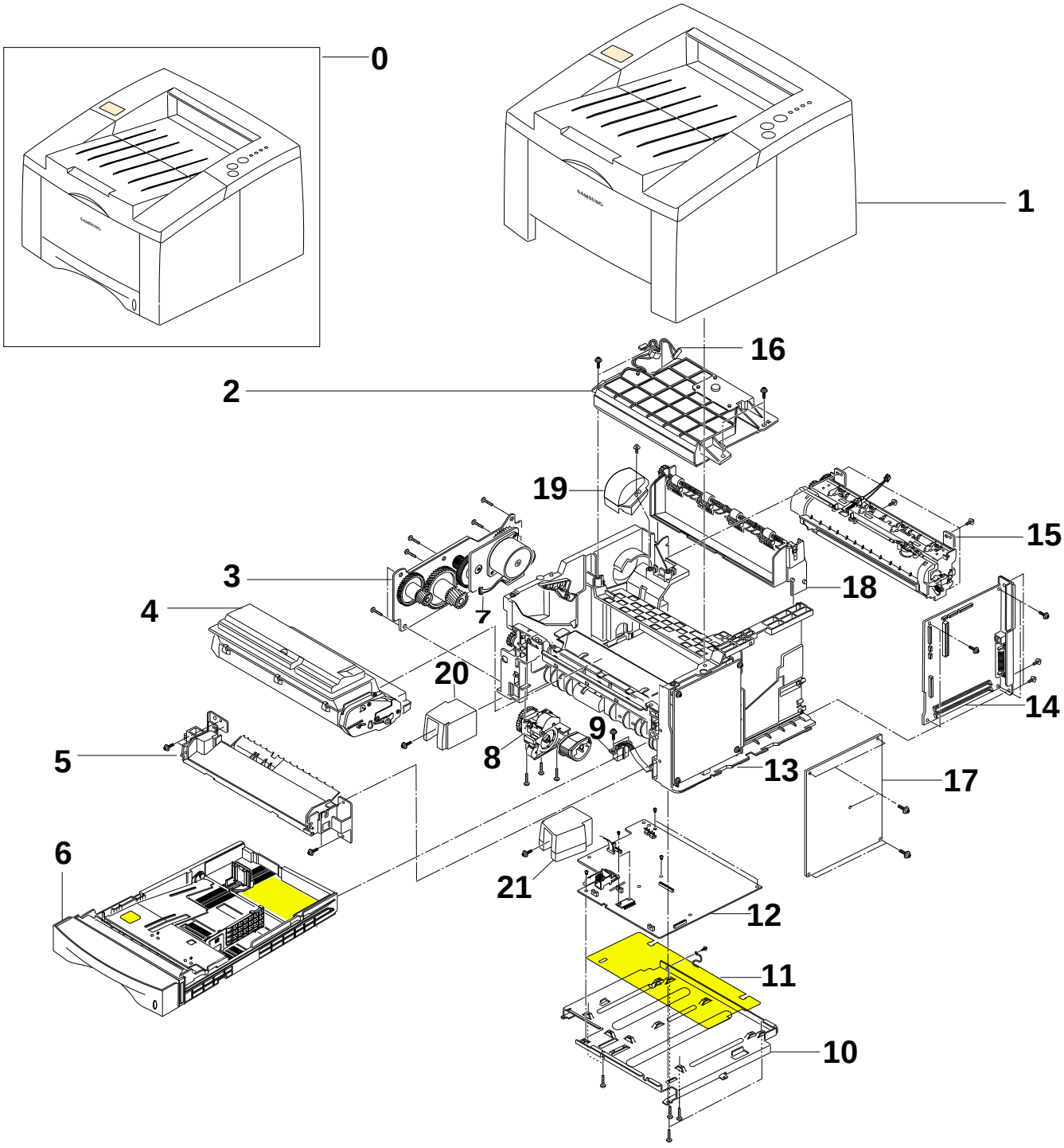
5-1 Main Exploded View



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Main Parts List

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
1	ELA HOU TOP-HOUSING	*	1	X	
2	UNIT-LSU	JC59-00004A	1	O	
3	ELA UNIT-MOTOR	JC96-01656A	1	O	
4	ELA UNIT-DEVE	*	1	X	
5	ELA HOU-MPE	JC96-01650A	1	O	
6	MEA RACK-FEEDER CST	JC97-01371A	1	O	270SHEETS
7	CBF-HARNESS-MOTOR	*	1	X	
8	MEA UNIT-FEEDER	JC97-01324A	1	O	
9	PMO-CAP SENSOR	JC72-00320A	1	O	
10	SHIELD-PCU	JC70-00080A	1	O	
11	PCT-INSULATOR PCU	JC72-00334A	1	O	
12	PBA MAIN-ENGINE_V1	JC92-01187A	1	O	110V
12	PBA MAIN-ENGINE_V2	JC92-01190A	1	O	220V
13	ELA UNIT-FRAME BASE	JC96-01641B	1	O	
14	PBA MAIN CTRL-LOW	JC92-01258A	1	O	
15	ELA UNIT-FUSER	JC96-01778B	1	O	110V
15	ELA UNIT-FUSER	JC96-01778C	1	O	220V
16	CBF HARNESS-LSU	*	1	X	
17	PBA PWR-HVPS_HAWK	JC92-01175A	1	O	
18	MEA RACK-HOU EXIT	JC97-01338A	1	O	
19	PMO-DUCT FAN	JC72-00582A	1	O	
20	PMO-DUMMY FACE MAIN(L)	*	1	X	
21	PMO-DUMMY FACE MAIN(R)	*	1	X	

Indicate part is for electrical safety components

O: Service available X: Service not available

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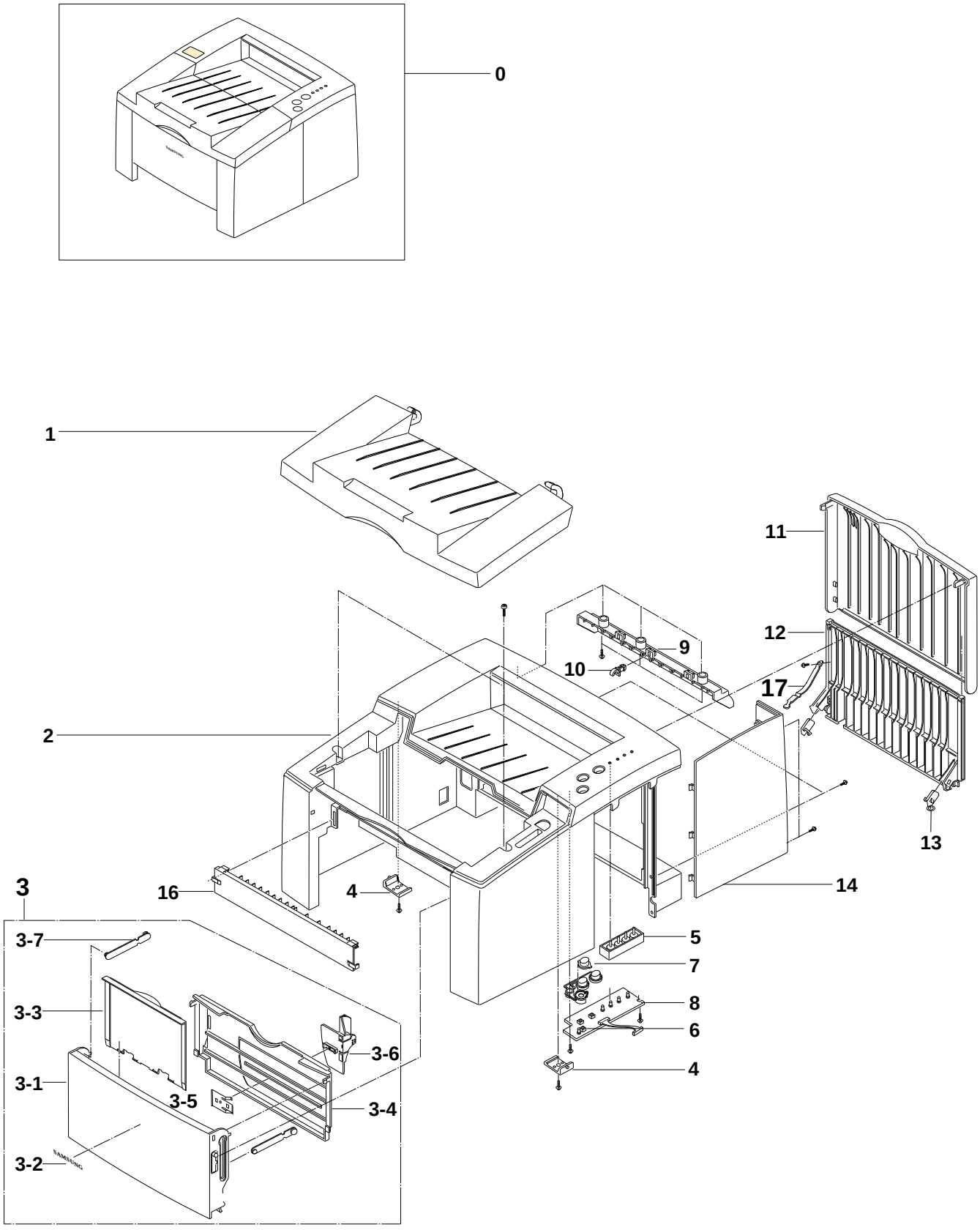
5-2 Cover Exploded View



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Cover Parts List

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
0	ELA COVER-HOUSING	JC96-01590B	1	O	
1	PMO-COVER OPEN	*	1	X	
2	PMO-COVER MAIN	*	1	X	
3	MEA RACK-MP TRAY	JC72-00349A	1	O	
3-1	PMO-COVER-MP	*	1	X	
3-2	NPR-BADGE (45)	*	1	X	
3-3	PMO-TRAY EXTENSION MP	*	1	X	
3-4	PMO-COVER MANUAL	*	1	X	
3-5	PMO-TRAY LINK MP	*	1	X	
4	STOPPER HINGE OPEN	*	2	X	
5	PMO-LENS LED	*	1	X	
6	PMO-KEY BUTTON	*	1	X	
7	PMO-KEY SAVE MODE	*	1	X	
8	PBA LED PANEL-II	*	1	X	
9	PMO-GUIDE EXIT	*	1	X	
10	PMO-BUSHING F/DOWN	*	1	X	
11	PMO-COVER REAR	*	1	X	
12	PMO-STACKER REAR	*	1	X	
13	IPR-SPRING LOCKER REAR	*	2	X	
14	PMO-COVER CONTROLLER	JC72-00358A	1	O	
15	PMO-CAP REAR	*	1	X	
16	PMO-SUPPONT MP TRAY	*	1	X	
17	PMO-STOPPER_EXIT,P	*	1	X	
S1	SCREW-TAPTITE	*	7	X	

O: Service available X: Service not available

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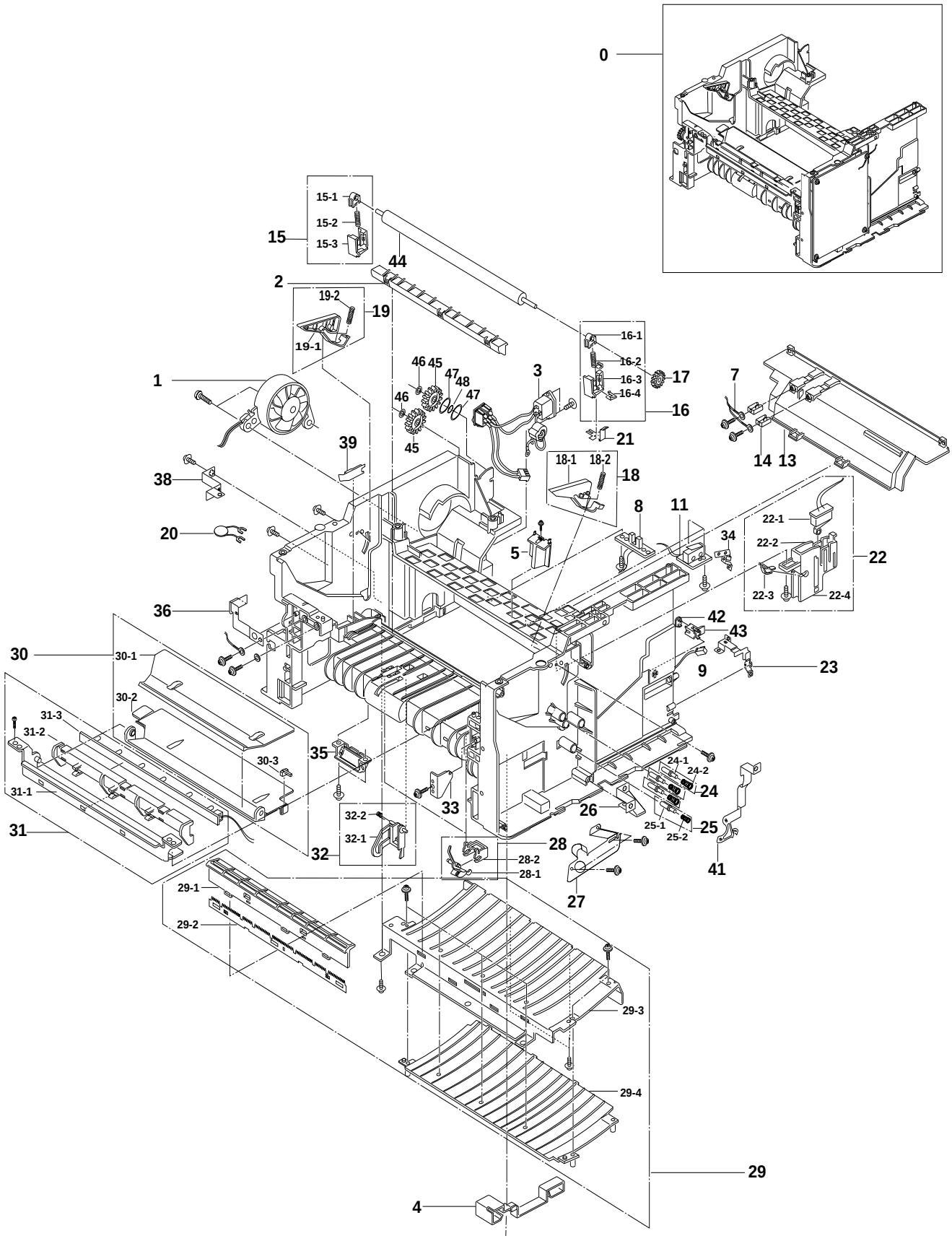
5-3 Frame Exploded View



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Frame Parts List

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
0	ELA UNIT-FRAME BASE				
1	FAN-DC-HAWK	JC31-00004A	1	O	
2	PMO-GUIDE RIB	*	1	X	
3	CBF HARNESS-INLET ASS'Y	*	1	X	
4	PMO-HOLDER WIRE	*	1	X	
5	KEY DEVE	*	1	X	
6	CBF HARNESS-ENGINE_CONTROL	*	1	X	
7	CBF-HARNESS_FUSER	*	1	X	
8	PBA SUB-EXIT SENSOR	*	1	X	
9	CBF-HARNESS-THERMISTOR JOINT	*	1	X	
11	PBA SUB-FUSER_SW	JC92-01261B	1	O	
13	PMO-FRAME COVER	*	1	X	
14	IPR-TERMINAL FU	*	2	X	
15	ELA-UNIT-HOLDER TR L	JC96-01730A	1	O	
15-1	PMO-BUSHING TR	*	1	X	
15-2	SPRING TR L	*	1	X	
15-3	PMO-TRANSFER HOLDER	*	1	X	
16	ELA-UNIT-HOLDER TR R	JC96-01729A	1	O	
16-1	PMO-BUSHING TR	*	1	X	
16-2	SPRING TR R	*	1	X	
16-3	PMO-TRANSFER HOLDER	*	1	X	
16-4	IPR-PLATE TR	*	1	X	
17	GEAR-TR 29	JC66-00039A	1	O	
18	ELA UNIT-GUIDE DEVE L	*	1	X	
18-1	PMO-GUIDE DEVE L	*	1	X	
18-2	SPRING GUIDE DEVE	*	1	X	
19	ELA UNIT-GUIDE DEVE R	*	1	X	
19-1	PMO-GUIDE DEVE R	*	1	X	
19-2	SPRING GUIDE DEVE	*	1	X	

O: Service available X: Service not available

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Frame Parts Lists

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
20	ELA HOU-VARISTOR	JC96-01772A	1	O	
21	IPR-TERMINAL TR	*	1	X	
22	ELA UNIT-SENSOR DEVE	*	1	X	
22-1	PBA SUB-SWITCH	*	1	X	
22-2	PMO-HOLDER ACTUATOR	*	1	X	
22-3	PMO-ACTUATOR DEVE	*	1	X	
23	GROUND FU	*	1	X	
24	ELA UNIT-TERMINAL TR L	*	3	X	
24-1	ICT-SHAFT HV LARGE	*	3	X	
24-2	SPRING-HV LARGE	*	3	X	
25	ELA UNIT-TERMINAL TR S	*	1	X	
25-1	ICT-SHAFT HV LARGE	*	1	X	
25-2	SPRING-HV SMALL	*	1	X	
26	GROUND-HVPS	*	1	X	
27	IPR-REMOVE KEY	JC70-00139A	1	O	
28	ELA UNIT-ACTUATOR FEED	*	1	X	
28-1	PMO-ACTUATOR FEED	*	2	X	
28-2	PMO-HOLDER ACTUATOR	*	2	X	
29	ELA UNIT-GUIDE TRANSFER	*	1	X	
29-1	PMO-HADER SAW PLATE	*	1	X	
29-2	IPR-PLATE SAW	*	1	X	
29-3	IPR-GUIDE TRANSFER	*	1	X	
29-4	PMO-GUIDE RIB TR	*	1	X	
30	ELA UNIT-GUIDE FEED	JC96-01653A	1	O	
30-1	PMO-GUIDE OPTIC	*	1	X	
30-2	GUIDE FEED	*	1	X	
30-3	PMO-HOLDER G/PAPER	*	1	X	
31	ELA UNIT-PTL	*	1	X	
31-1	GUIDE PLATE FEED	*	1	X	
31-2	PMO-HOLDER PTL	*	1	X	
31-3	PBA SUB-PTL	*	1	X	

O: Service available X: Service not available

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Frame Parts Lists

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
32	ELA UNIT-EMPTY ACT	*	1	X	
32-1	PMO-ACTUATOR EMPTY HAWK	*	1	X	
32-2	SPRING EMPTY	*	1	X	
33	PMO-HINGE GUIDE FEED	JC72-00321A	1	O	
34	GND ICU	*	1	X	
35	PMO-CAP SENSOR	*	1	X	
36	GND MP	*	1	X	
39	IPR-GUIDE DUST	*	1	X	
41	IPR-OPC-HAWK	*	1	X	
42	CAP CONNECTOR L	*	1	X	
43	CAP CONNECTOR U	*	1	X	
44	MEC-ROLLER TRANSFER	JC75-10963B	1	O	
45	GEAR IDLE Z27	*	2	X	
46	RING-CS	*	2	X	
47	WASHER-PLAIN	*	2	X	
48	IPR-WASHER SPRING SU	*	1	X	

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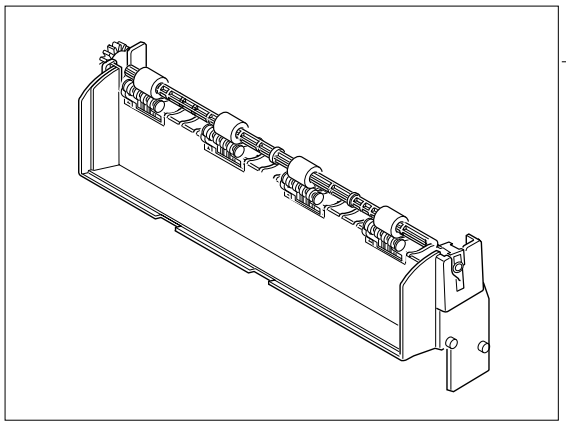
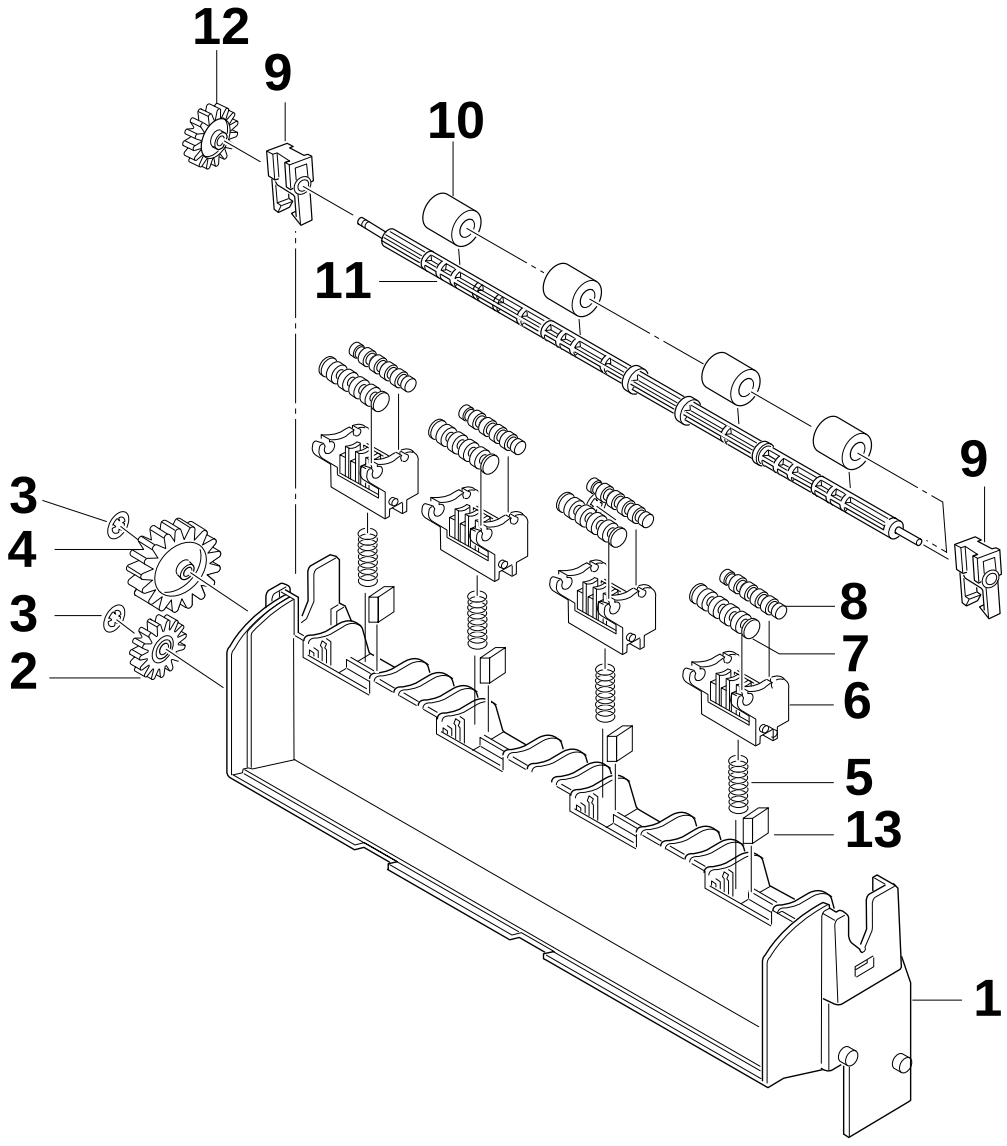
5-4 Exit Exploded View





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Exit Parts List

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
0	MEA RACK-HOU EXIT	JC97-01338A	1	O	
1	PMO-FRAME REAR	*	1	X	
2	GEAR-IDLE 15	*	1	X	
3	RING-CS	*	2	X	
4	GEAR-IDLE 25	*	1	X	
5	SPRING-F/DOWN	*	4	X	
6	PMO-HOLDER EXIT_F/DOWN	*	4	X	
7	PMO-ROLLER-EXIT, MAIN	*	4	X	
8	PMO-ROLLER-EXIT, FR	*	4	X	
9	MEC-BEARING EXIT	*	2	X	
10	RMO-RUBBER EXIT	*	4	X	
11	PMO-SHAFT EXIT_F/DOWN	*	1	X	
12	GEAR-EXIT	JC66-40209A	1	O	
13	RMP-RUBBER EXIT_F/UP	*	4	X	

O: Service available X: Service not available

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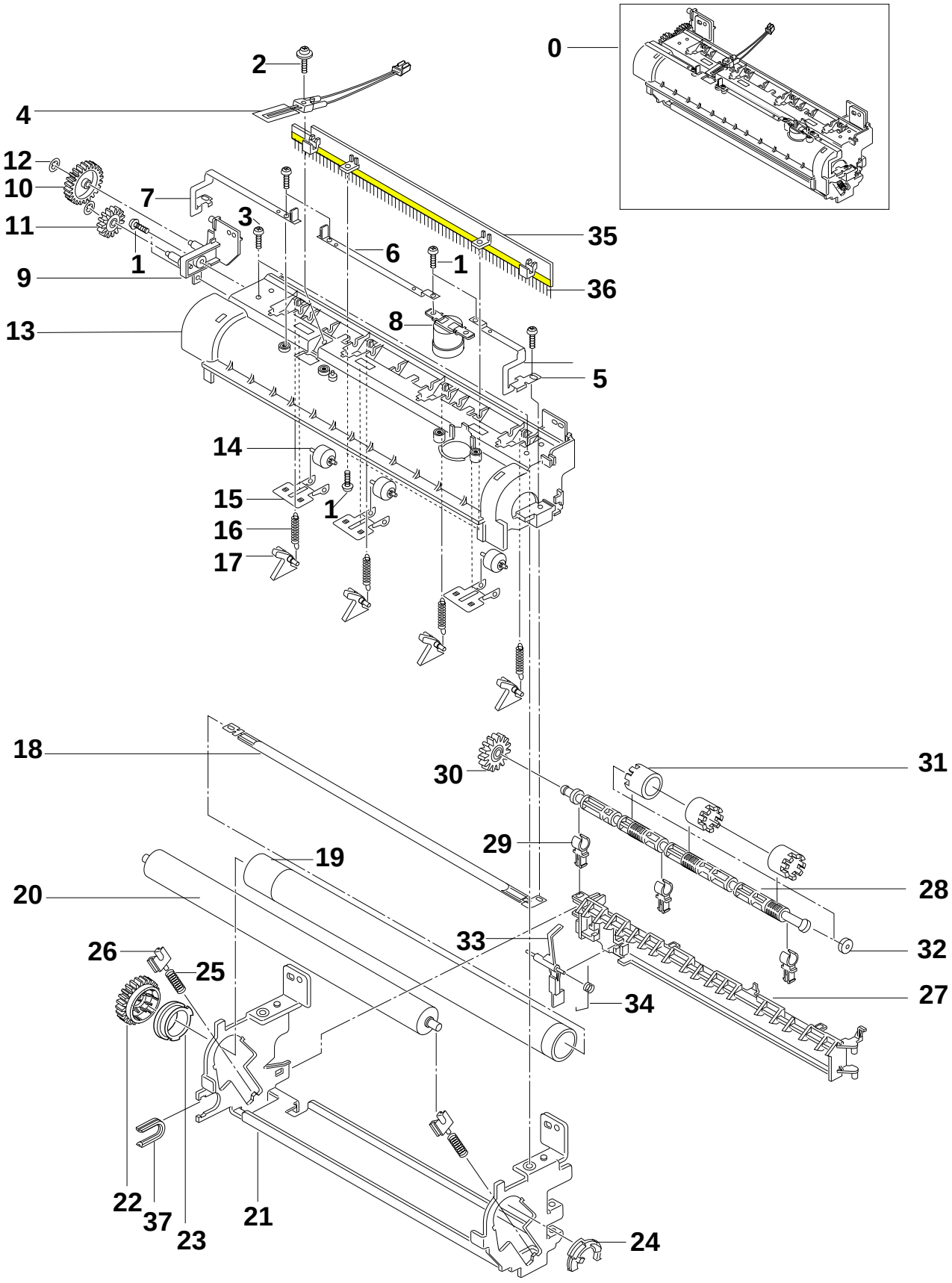
5-5 Fuser Exploded View



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Fuser Parts List

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
0 ⚠	ELA UNIT FUSER (110V)	JC96-01778B	1	O	110V
0 ⚠	ELA UNIT FUSER (220V)	JC96-01778C	1	O	220V
1	SCREW TAPTITE M3 x 8, BH+	*	6	X	
2	SCREW TAPTITE M3 x 10, FH+	*	1	X	
3	SCREW MACHINE M3 x 6	*	2	X	
4	THERMISTOR-FUSER	JC14-00001A	1	O	
5	ELECTRODE FU R	*	1	X	
6	ELECTRODE FU M	*	1	X	
7	ELECTRODE FU L	*	1	X	
8	THERMOSTAT	*	1	X	
9	BRKT GEAR FUSER	*	1	X	
10	GEAR-IDLE 25	*	1	X	
11	GEAR-IDLE 15	*	1	X	
12	RING-CS	*	2	X	
13	COVER FUSER	*	1	X	
14	ROLLER EXIT_F/UP	*	3	X	
15	EXIT_F/UP (SPRING)	*	3	X	
16	SPRING-CLAW	*	4	X	
17	GUIDE-CLAW	*	4	X	
18 ⚠	LAMP-HALOGEN	4713-001135	1	O	110V
18 ⚠	LAMP-HALOGEN	4713-001136	1	O	220V
19	NEX-ROLLER-HEAT	JC71-20901A	1	O	
20	MEC-ROLLER_PRESSORE	JC75-10956A	1	O	
21	FRAME FUSER	*	1	X	
22	GEAR FUSER, Z32	*	1	X	
23	BUSHING HR-L	*	1	X	
24	BUSHING HR-R	*	1	X	
25	SPRING-BEARING PR	*	2	X	
26	BUSHING PR	*	2	X	
27	GUIDE REAR	*	1	X	
28	SHAFT EXIT_F/UP	*	1	X	
29	BUSHING_TX	*	3	X	
30	GEAR-EXIT	*	1	X	
31	RUBBER EXIT	*	3	X	
32	RUBBER EXIT F/UP	*	1	X	
33	ACTUATOR EXIT	*	1	X	
34	SPRING-ACTUATOR	*	1	X	
35	HOLDER BRUSH	*	1	X	
36	BRUSH ANTISTATIC	*	1	X	
37	HOLDER SHAFT	*	1	X	
38	SEREW TAPTITE M3X6,BH+	*	4	X	

Indicate part is for electrical safety components

O: Service available X: Service not available

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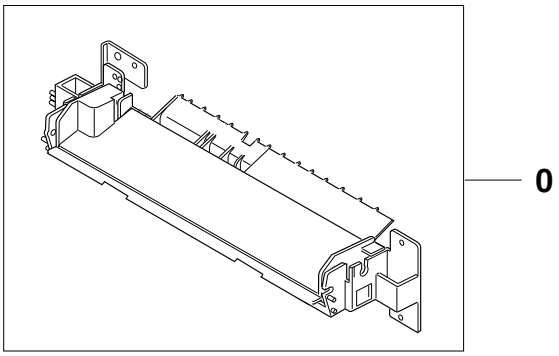
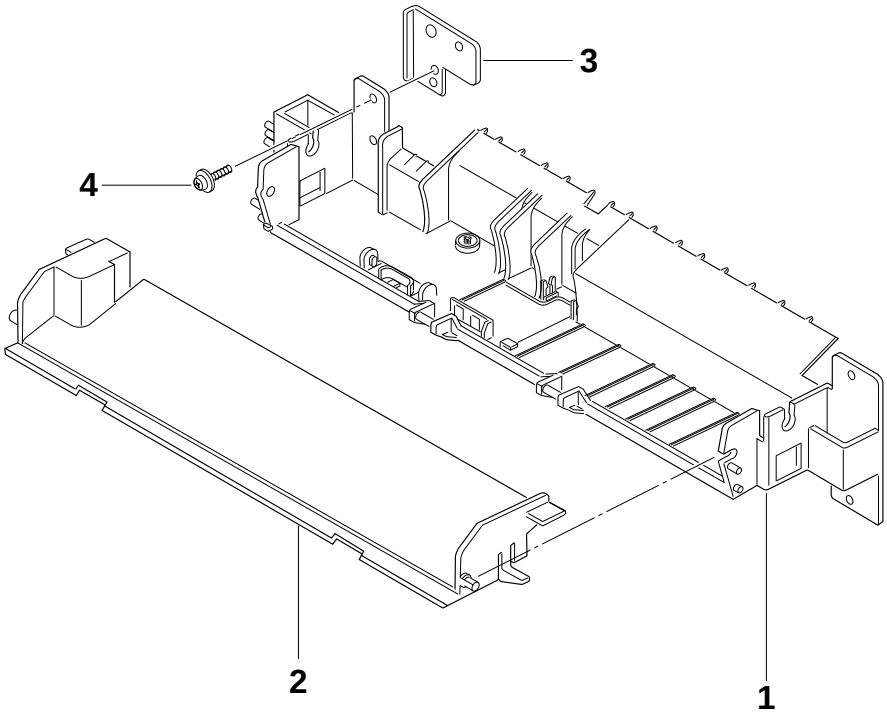
5-6 Rack-MPF Exploded View





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Rack-MPF Parts List

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
0	ELA HOU-MPF	JC97-01345A	1	O	
1	PMO-FRAME_MP	*	1	X	
2	PMO-PLATE MANUAL	*	1	X	
3	BRACKET-MANUAL	*	1	X	
4	SCREW TAPTITE	*	1	X	

O: Service available X: Service not available

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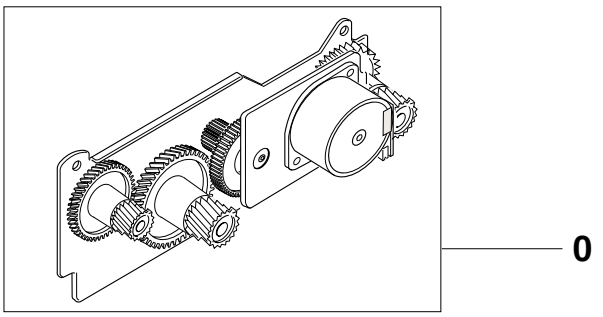
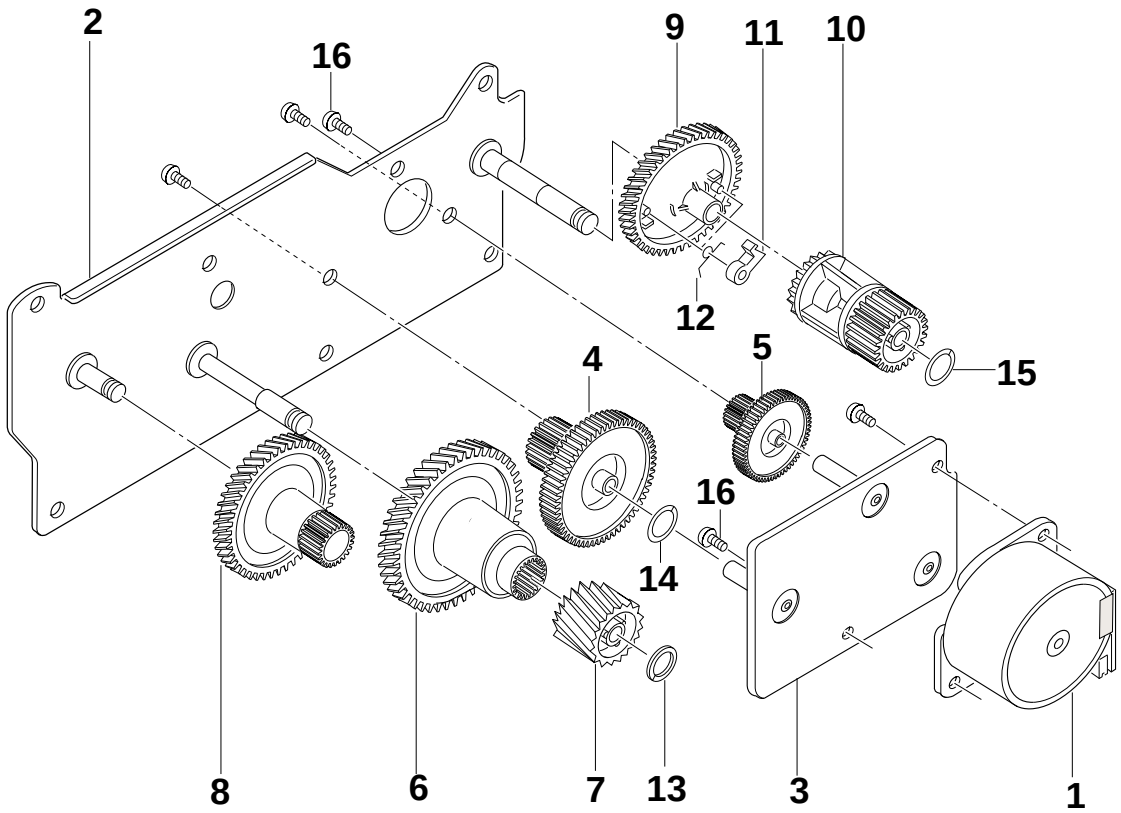
5-7 Drive Exploded View





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Drive Parts List

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
0	ELA UNIT-MOTOR	JC96-01656A	1	O	
1	MOTOR-STEP	JC31-00002A	1	O	
2	IPR-BRKT GEAR	*	1	X	
3	IPR-BRKT MOTOR	*	1	X	
4	GEAR-RDCN 145-70	*	1	X	
5	GEAR-RDCN 90-24	*	1	X	
6	GEAR-OPC DRV 135	*	1	X	
7	GEAR-OPC DRIVE2	*	1	X	
8	GEAR-FEED DRV	*	1	X	
9	GEAR-CLUTCH 56	*	1	X	
10	GEAR-FUSER DRV23	*	1	X	
11	PMO-CLUTCH LEVER	*	2	X	
12	SPRING-CLUTCH	*	2	X	
13	WASHER-PLAIN	*	1	X	
14	MPR-POLYWASHER 8	*	1	X	
15	WASHER-PLAIN	*	1	X	
16	SCREW-MACHINE	*	5	X	

O: Service available X: Service not available

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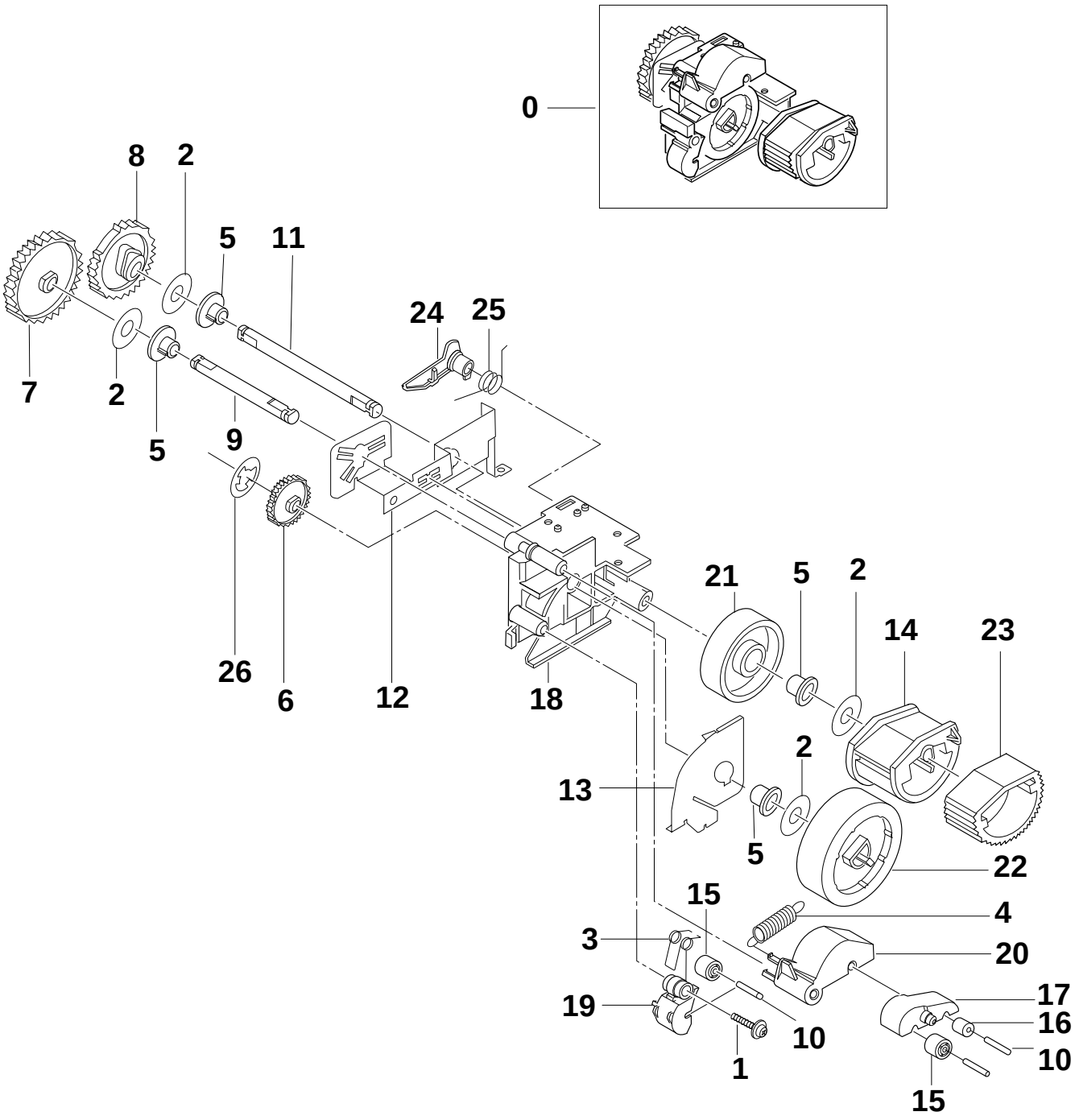
5-8 Pick-Up Exploded View



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Pick-Up Parts List

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
0	MEA RACK-FEEDER	JC97-01324A	1	O	
1	SCREW-TAPTITE	*	1	X	
2	WASHER-PLAIN	*	4	X	
3	SPRING-FEED(1)	*	1	X	
4	SPRING-FEED(2)	*	1	X	
5	BEARING-PICK UP	*	4	X	
6	GEAR-P/UP DRIVE	*	1	X	
7	GEAR-FEED	*	1	X	
8	GEAR-PICK UP(12)	*	1	X	
9	IPR-SHAFT FEED	*	1	X	
10	IPR-SHAFT FEED IDLER	*	3	X	
11	IPR-SHAFT PICK UP	*	1	X	
12	GROUND_FEED	*	1	X	
13	IPR-GUIDE_FEED	*	1	X	
14	PMO-HOUSING P/UP	*	1	X	
15	PMO-ROLLER FEED L	*	2	X	
16	PMO-ROLLER FEED S	*	1	X	
17	PMO-SUB HOLDER FEED	*	1	X	
18	PMO-FRAME_FEED	*	1	X	
19	PMO-HOLDER FEED(1)	*	1	X	
20	PMO-HOLDER FEED(2)	*	1	X	
21	PMO-IDLE PICK_UP	*	1	X	
22	PMO-ROLL_FEED, DRV 12	*	1	X	
23	RMO-RUBBER PICK_UP	*	1	X	
24	RMO-LEVER PICK_UP	*	1	X	
25	SPRING PICK UP(12)	*	1	X	
26	RING-CS	*	1	X	

O: Service available X: Service not available

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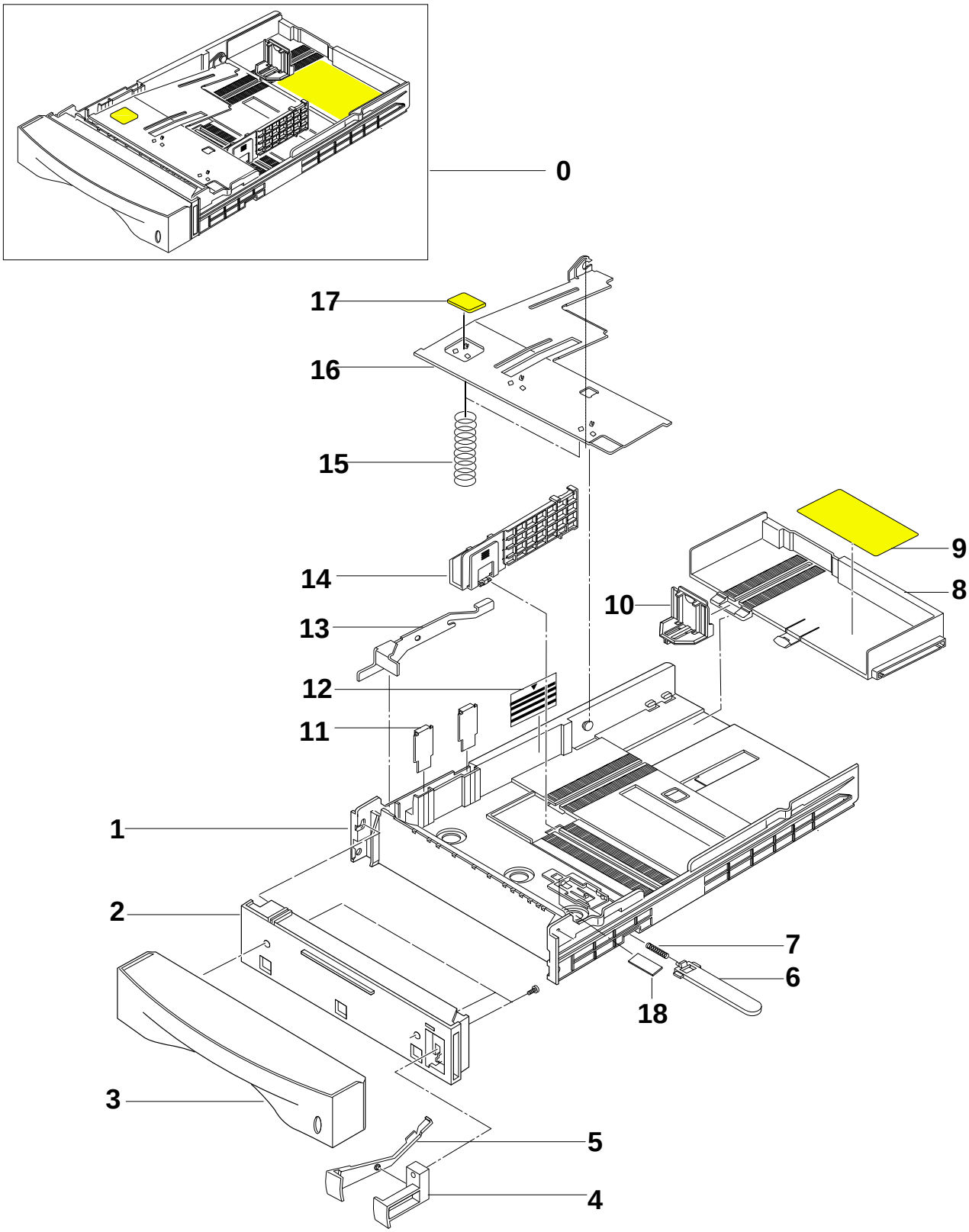
5-9 Cassette Exploded View (270)



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Cassette Parts List

SA. : Service Available

Location No.	Description	SEC. Code	Q'ty	SA	Remark
0	MEA RACK-FEEDER CST	JC97-01371A	1	O	2700SHEETS
1	PMO-FRAME CASSETTE	*	1	X	
2	PMO-GUIDE INNER,CAST	*	1	X	
3	PMO-GUIDE CASSETTE P	*	1	X	
4	PMO-HOLDER INDICATOR	*	1	X	
5	PMO-INDICATOR EMPTY	*	1	X	
6	PMO-LOCKER PLATE	*	1	X	
7	SPRING LOCKER PLATE	*	1	X	
8	PMO-FRAME LEGAL	*	1	X	
9	LABEL(R)-PLATE	*	1	X	
10	PMO-REAR GUIDE CST	*	1	X	
11	IPR-GUIDE PAPER	*	2	X	
12	LABEL(R)-HEIGHT	*	1	X	
13	IPR-FINGER	*	1	X	
14	PMO-SIDE GUIDE	*	1	X	
15	SPRING-KNOCK UP	*	1	X	
16	IPR-NOCK UP PLATE	*	2	X	
17	PAD KNOCK UP	*	1	X	
18	GUIDE-PAPER FILM	*	1	X	

O: Service available X: Service not available

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MEMO

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4. Troubleshooting

4-1 DCU Control

In case of ML-6060,you can not use the DCU under ‘Diagnostic mode’
But, you can check set condition by status code

4-1-1 DCU Setup

1) Connect DCU to Controller Board Connector CN9 (4 pins)).

4-1-2 DCU Error Status Code

DCU error code will indicate malfunction area of the machine.

Display	Error status
60	OPEN FUSER ERROR
62	LOW HEAT ERROR
68	OVER HEAT ERROR
64	COVER OPEN ERROR
70	NO PAPER or NO CASSETTE
71	PAPER JAM 0
72	PAPER JAM 1
73	PAPER JAM 2
95	LSU NOT READY

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4-1-3 Error Solution

Display	Solution
60, 62, 68	1. Measure the resistance of the AC connector on the Fuser. Normal resistance is 2-4 ohms for 110V, 6-8 ohms for 220V. 2. Check if the fuser lamp works properly. 3. Measure the resistance at Q7 on the engine board. If abnormal, replace U503,CN502,
70	1. Make sure that paper is loaded in the cassette. 2. Replace U555 sensor (photo interrupter). 3. Replace U7 on controller board.
71	1. Make sure that paper is loaded in the cassette. 2. Check for pick-up unit. If it is heavily worn, replace it with new one. 3. Replace U554 sensor. 4. Check if the feed clutch works properly. 5. If abnormal, replace the feed clutch or Q3 on the Engine board .
72, 73	1. Make sure that the paper being used meets the specification. 2. Check if there is a paper jam in the fuser. 3. Replace U554 on the engine board or exits ensor on the frame. 4. Check the fuser roller for any dirt. If dirty, clean the roller.
95	1. Check for CN11,CN6 on the Controller board. 2. Replace U5,OSC1 on the Engine board. 3. Replace LSU.

4-2 Abnormal Image Printing and Defective Roller

If abnormal image prints periodically, check the parts shown below.

No	Roller	Abnormal image period	Kind of abnormal image
1	OPC Drum	95.6mm	White spot/Black spot
2	Charge Roller	38.5mm	Black spot
3	Supply Roller	45.3mm	Horizontal density band
4	Develop Roller	47.1mm	Horizontal density band
5	Transfer Roller	56.1mm	Black side contamination/transfer fault
6	Heat Roller	69.3mm	Black spot and fuser ghost
7	Pressure Roller	72.5mm	Black side contamination

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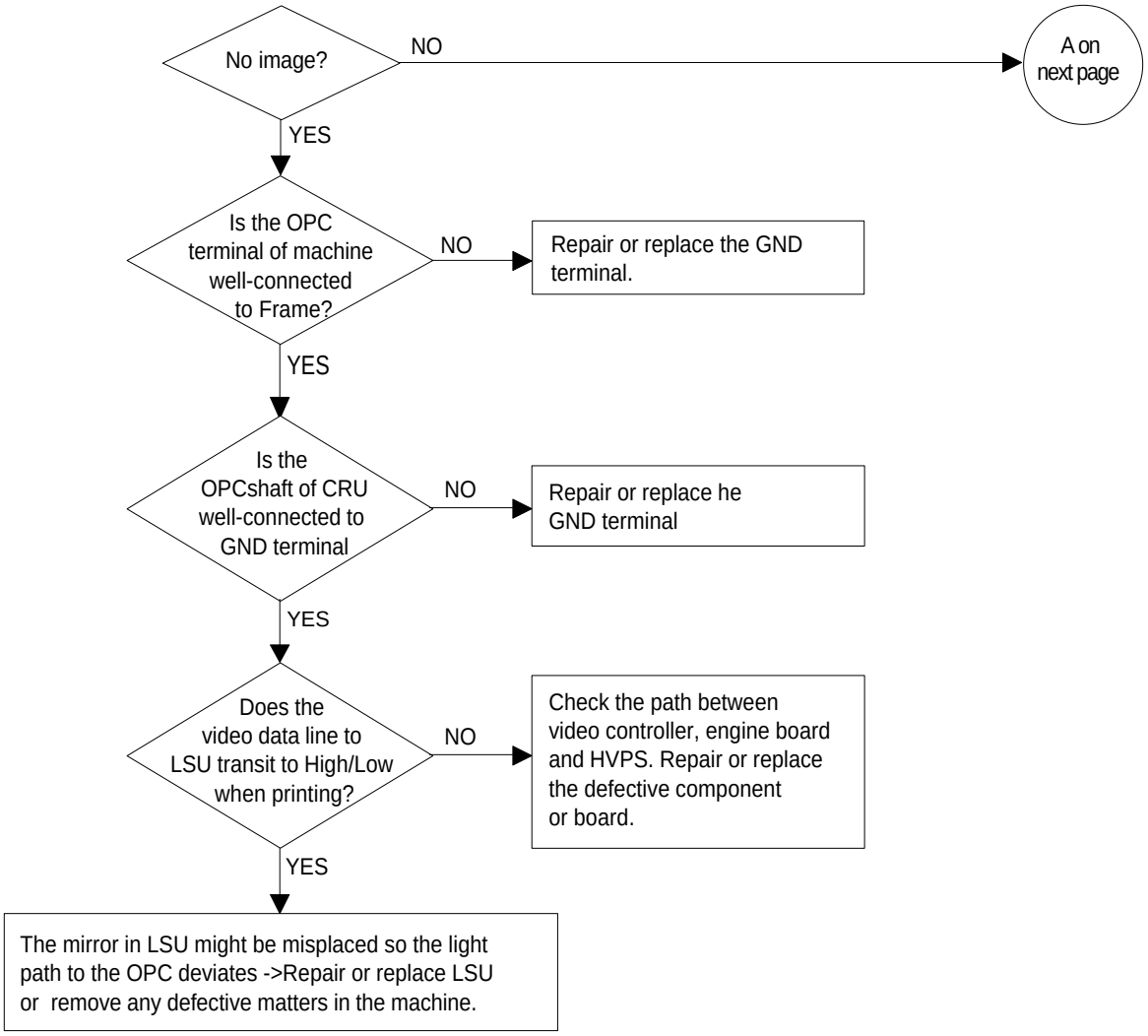
4-3 Print Quality

Notice

In the ML-6060 Series system, the Developing/Supplying bias is set to decrease by -50V increments when the system load is over the specified value. Therefore, if you check the bias without the toner cartridge, the system load is recognized to be infinity and Developing/Supplying bias decreases by -50V increments.
At the first warm-up after the printer is powered on and then off, the software does not have the data on system load, so the Developing/Supplying bias measures -500V/-650V, the basic voltage.
And, from the second warm-up and on, the software has the data on system load, so the bias measures -450V/-600V, which is less -50V than the basic voltage.

Without cartridge	First Warm-up	Second Warm-up
Developing Bias	-500V	-450V
Supplying Bias	-650V	-600v

4-3-1 No Image


No image?
NO
A on next page
YES
Is the OPC terminal of machine well-connected to Frame?
NO
Repair or replace the GND terminal.
YES
Is the OPCshaft of CRU well-connected to GND terminal
NO
Repair or replace he GND terminal
YES
Does the video data line to LSU transit to High/Low when printing?
NO
Check the path between video controller, engine board and HVPS. Repair or replace the defective component or board.
YES
The mirror in LSU might be misplaced so the light path to the OPC deviates ->Repair or replace LSU or remove any defective matters in the machine.

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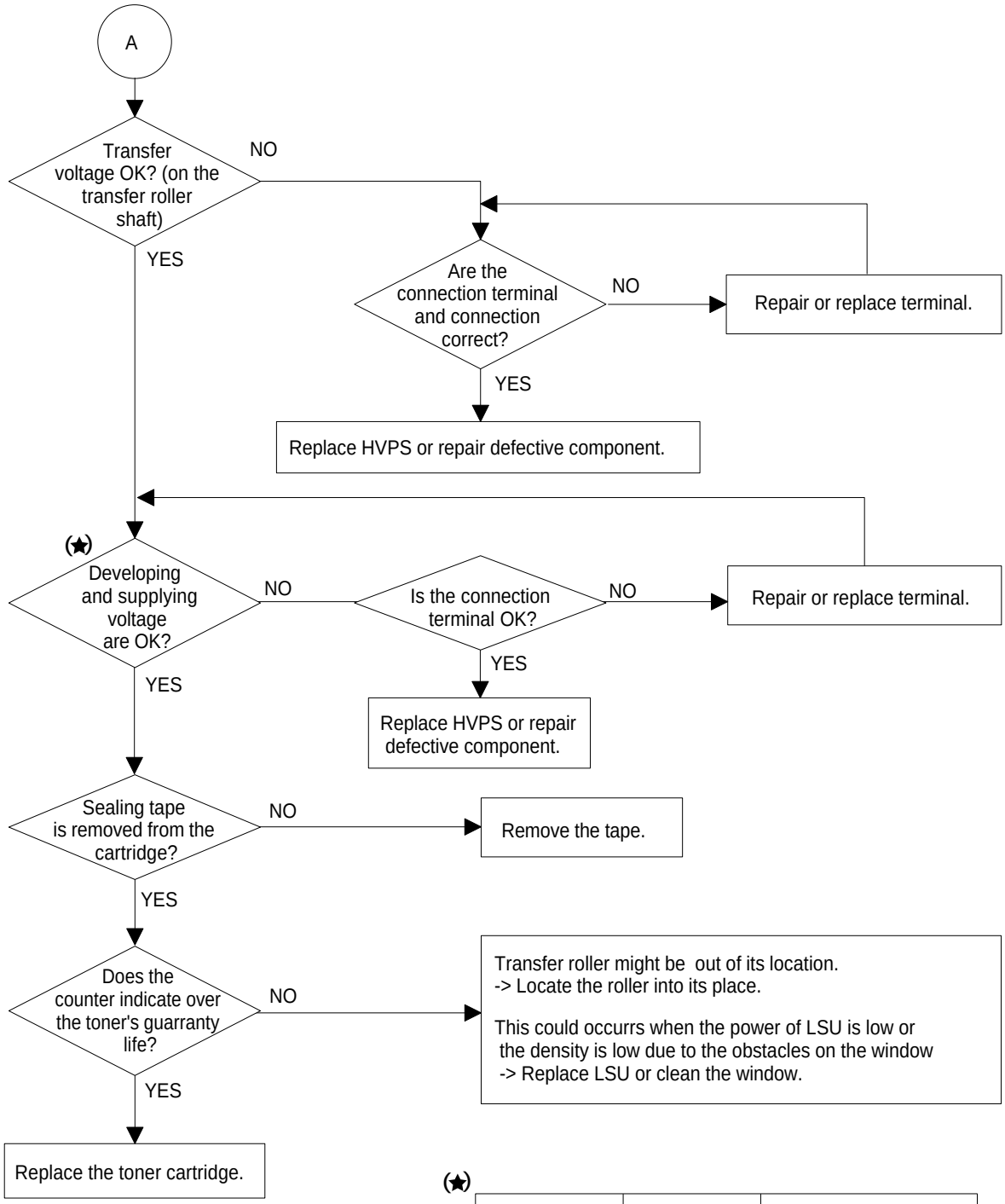
A
Transfer voltage OK? (on the transfer roller shaft)
NO
YES
Are the connection terminal and connection correct?
NO
Repair or replace terminal.
YES
Replace HVPS or repair defective component.
(★)
Developing and supplying voltage are OK?
NO
Is the connection terminal OK?
NO
Repair or replace terminal.
YES
Replace HVPS or repair defective component.
YES
Sealing tape is removed from the cartridge?
NO
Remove the tape.
YES
Does the counter indicate over the toner's guarranty life?
NO
Transfer roller might be out of its location.
-> Locate the roller into its place.
This could occurrs when the power of LSU is low or the density is low due to the obstacles on the window
-> Replace LSU or clean the window.
YES
Replace the toner cartridge.

(★)

	Normal	Without Cartridge
Developing	-500V	-450V
Supplying	-650	-600V

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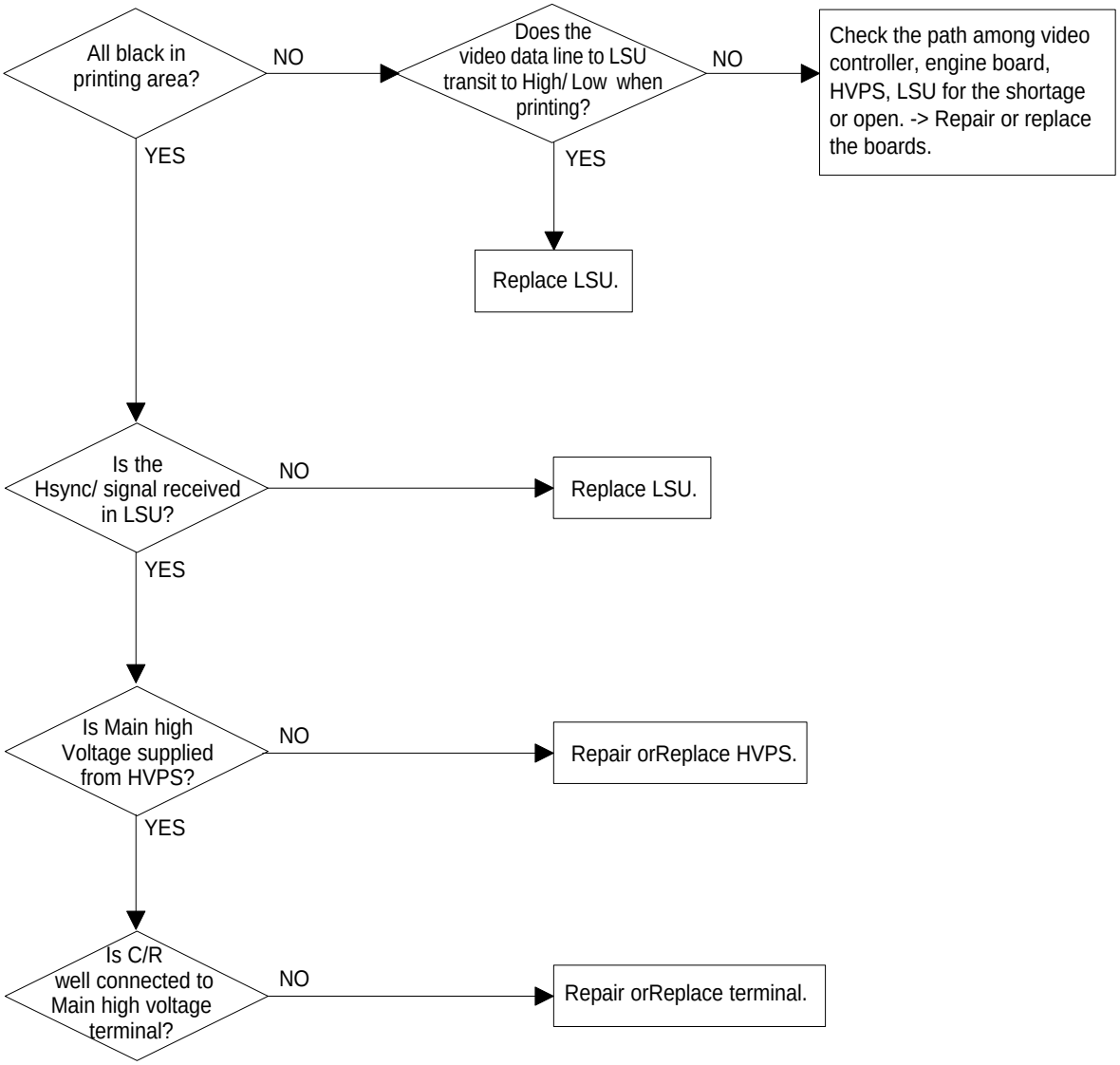
4-3-2 All Black


All black in printing area?
NO
Does the video data line to LSU transit to High/ Low when printing?
NO
Check the path among video controller, engine board, HVPS, LSU for the shortage or open. -> Repair or replace the boards.
YES
YES
Replace LSU.
Is the Hsync/ signal received in LSU?
NO
Replace LSU.
YES
Is Main high Voltage supplied from HVPS?
NO
Repair orReplace HVPS.
YES
Is C/R well connected to Main high voltage terminal?
NO
Repair orReplace terminal.

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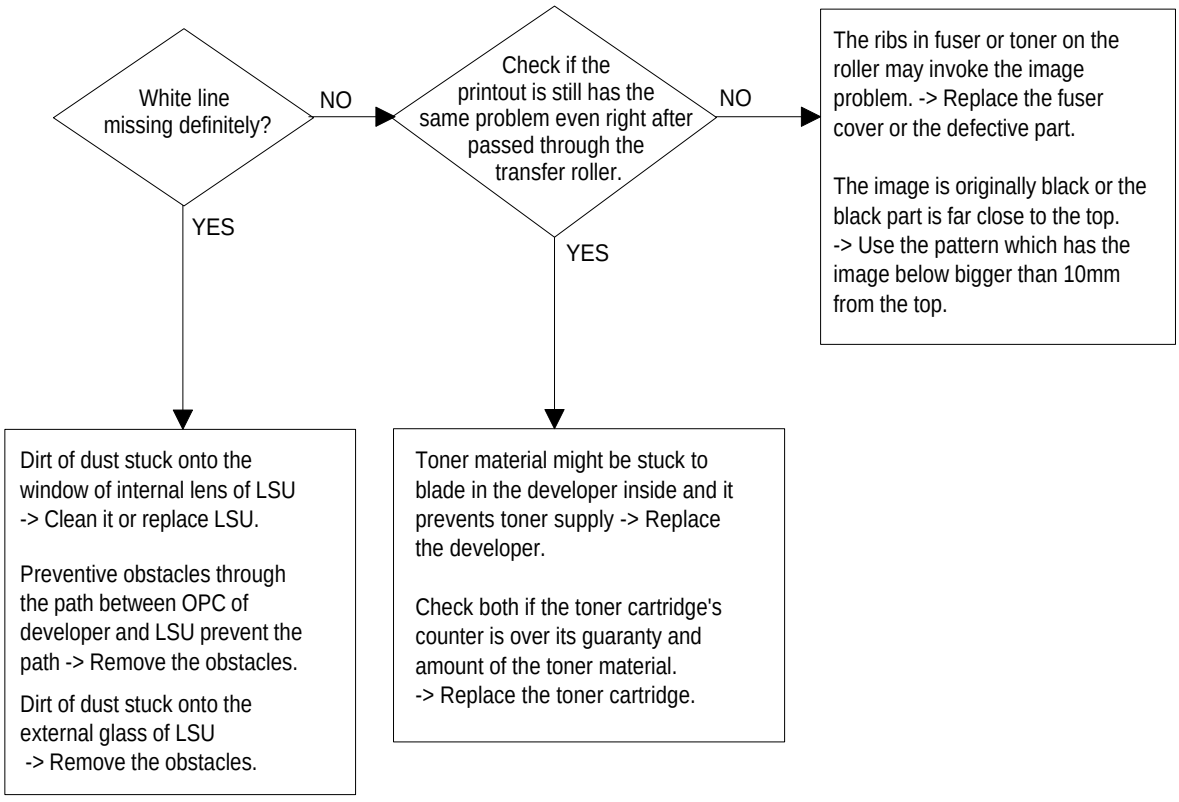
4-3-3 Vertical White Line (Band)


White line missing definitely?
NO
Check if the printout is still has the same problem even right after passed through the transfer roller.
NO
The ribs in fuser or toner on the roller may invoke the image problem. -> Replace the fuser cover or the defective part.
The image is originally black or the black part is far close to the top. -> Use the pattern which has the image below bigger than 10mm from the top.
YES
YES
Dirt of dust stuck onto the window of internal lens of LSU -> Clean it or replace LSU.
Preventive obstacles through the path between OPC of developer and LSU prevent the path -> Remove the obstacles.
Dirt of dust stuck onto the external glass of LSU -> Remove the obstacles.
Toner material might be stuck to blade in the developer inside and it prevents toner supply -> Replace the developer.
Check both if the toner cartridge's counter is over its guaranty and amount of the toner material. -> Replace the toner cartridge.

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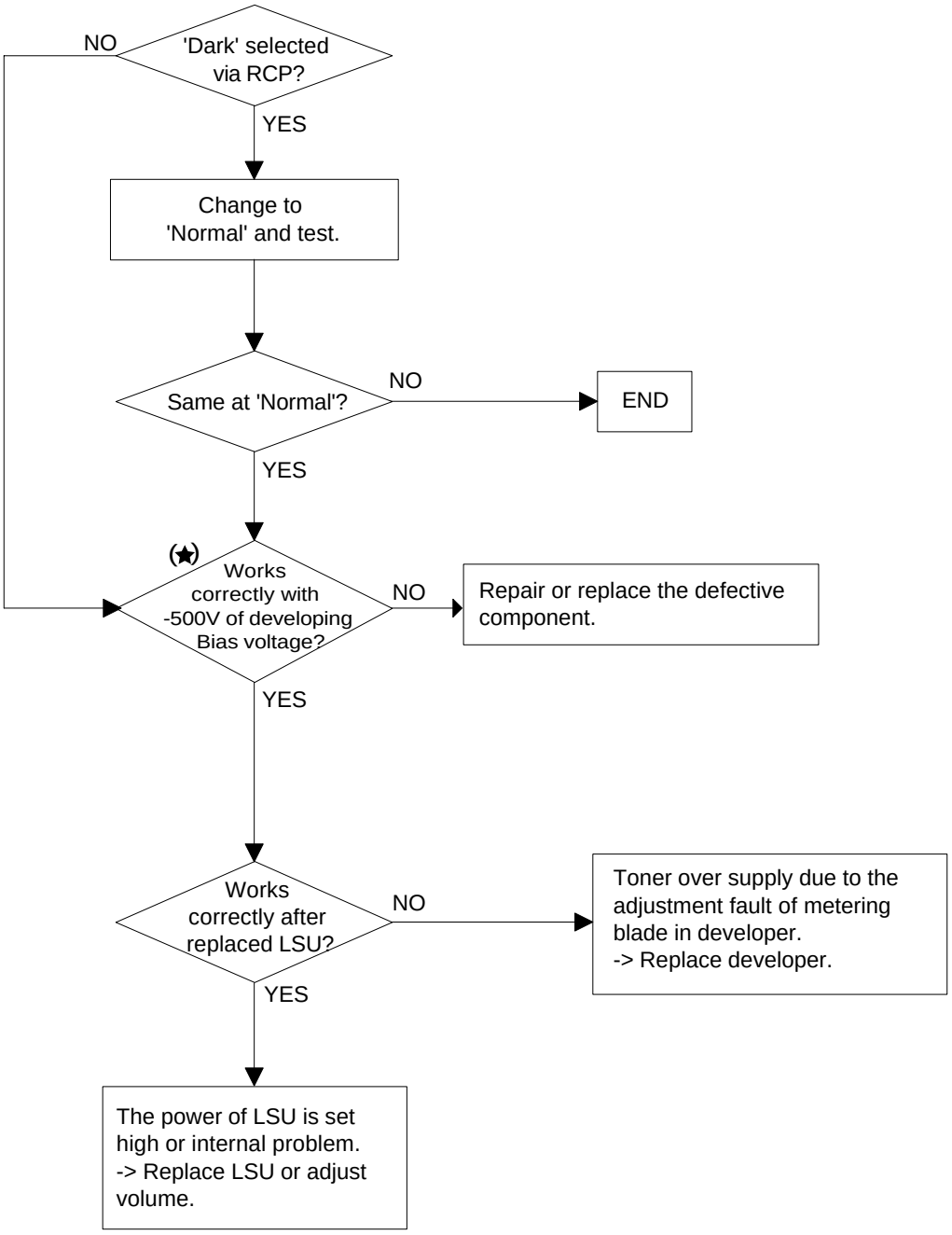
4-3-4 Dark Image



(★)

	Normal	Without Cartridge
Developing	-500V	-450V
Supplying	-650	-600V

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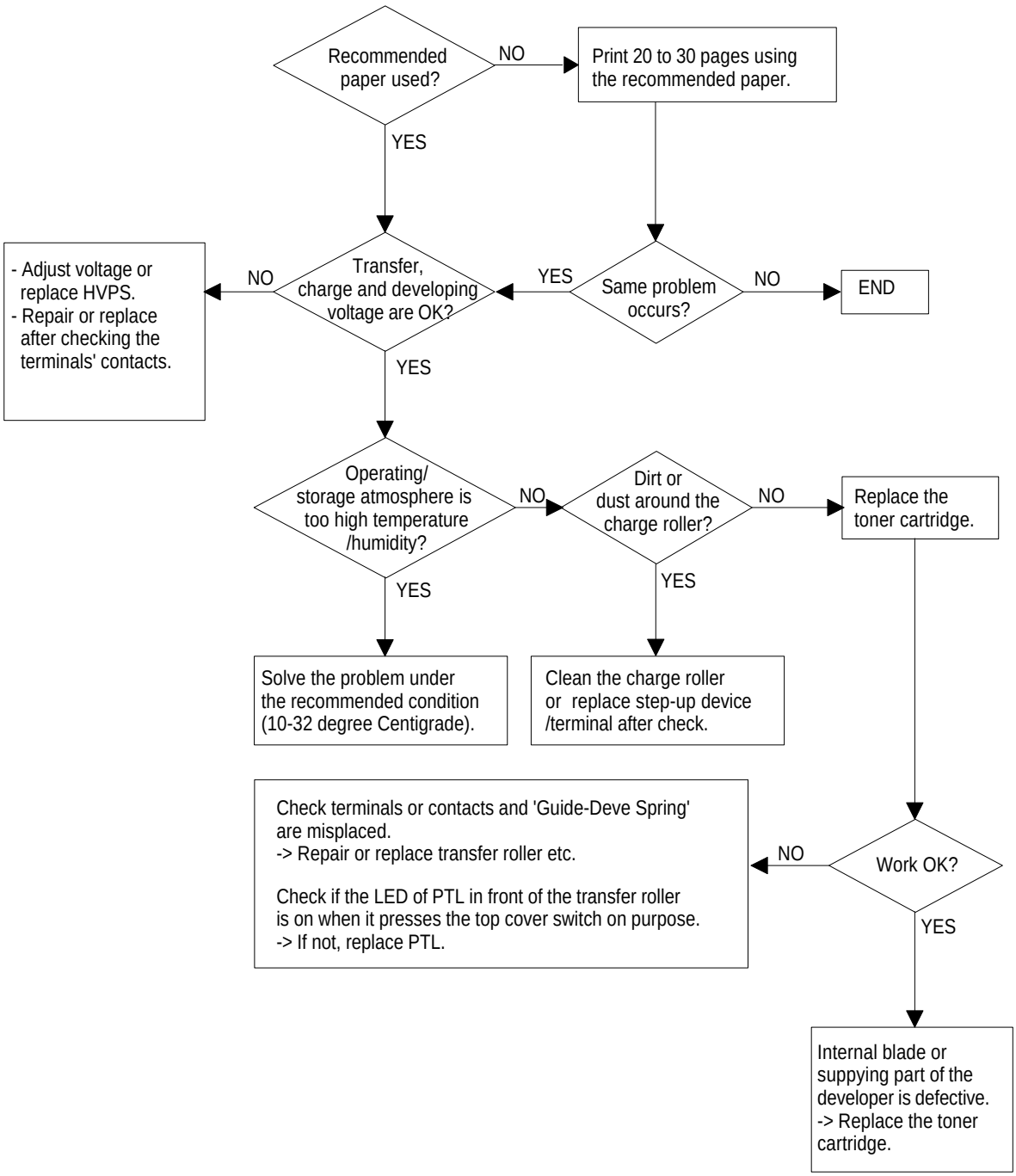
4-3-5 Background


Recommended paper used?
NO
Print 20 to 30 pages using the recommended paper.
YES
Same problem occurs?
NO
END
YES
Transfer, charge and developing voltage are OK?
NO
- Adjust voltage or replace HVPS.
- Repair or replace after checking the terminals' contacts.
YES
Operating/ storage atmosphere is too high temperature /humidity?
NO
Dirt or dust around the charge roller?
NO
Replace the toner cartridge.
YES
YES
Solve the problem under the recommended condition (10-32 degree Centigrade).
Clean the charge roller or replace step-up device /terminal after check.
Work OK?
NO
Check terminals or contacts and 'Guide-Deve Spring' are misplaced.
-> Repair or replace transfer roller etc.
Check if the LED of PTL in front of the transfer roller is on when it presses the top cover switch on purpose.
-> If not, replace PTL.
YES
Internal blade or suppying part of the developer is defective.
-> Replace the toner cartridge.

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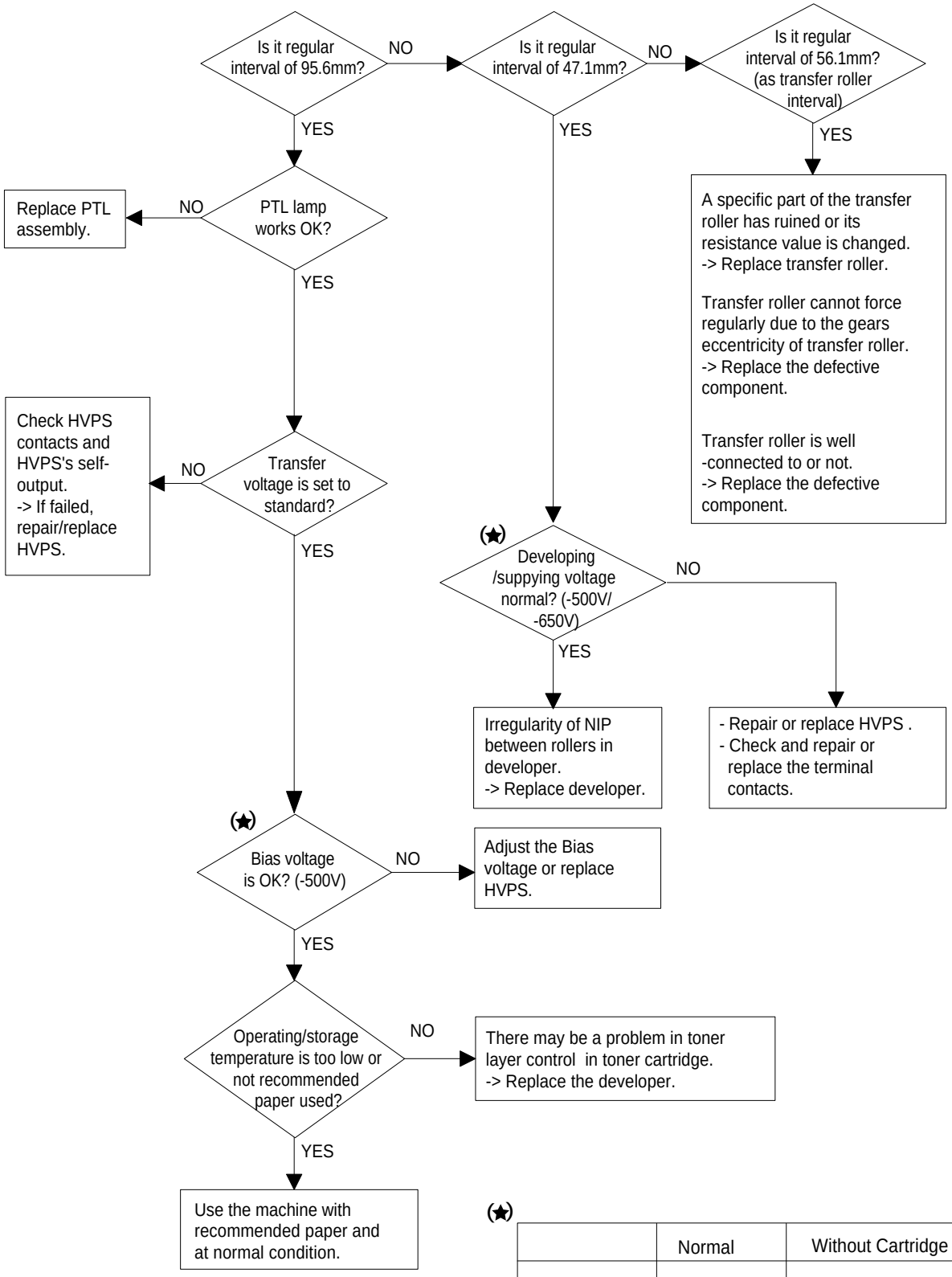
4-3-6 Ghost


Is it regular interval of 95.6mm?
NO
Is it regular interval of 47.1mm?
NO
Is it regular interval of 56.1mm? (as transfer roller interval)
YES
YES
YES
Replace PTL assembly.
NO
PTL lamp works OK?
YES
A specific part of the transfer roller has ruined or its resistance value is changed.
-> Replace transfer roller.
Transfer roller cannot force regularly due to the gears eccentricity of transfer roller.
-> Replace the defective component.
Transfer roller is well -connected to or not.
-> Replace the defective component.
Check HVPS contacts and HVPS's self-output.
-> If failed, repair/replace HVPS.
NO
Transfer voltage is set to standard?
YES
(★)
Developing /suppying voltage normal? (-500V/ -650V)
NO
YES
Irregularity of NIP between rollers in developer.
-> Replace developer.
- Repair or replace HVPS .
- Check and repair or replace the terminal contacts.
(★)
Bias voltage is OK? (-500V)
NO
Adjust the Bias voltage or replace HVPS.
YES
Operating/storage temperature is too low or not recommended paper used?
NO
There may be a problem in toner layer control in toner cartridge.
-> Replace the developer.
YES
Use the machine with recommended paper and at normal condition.

(★)

	Normal	Without Cartridge
Developing	-500V	-450V
Supplying	-650	-600V

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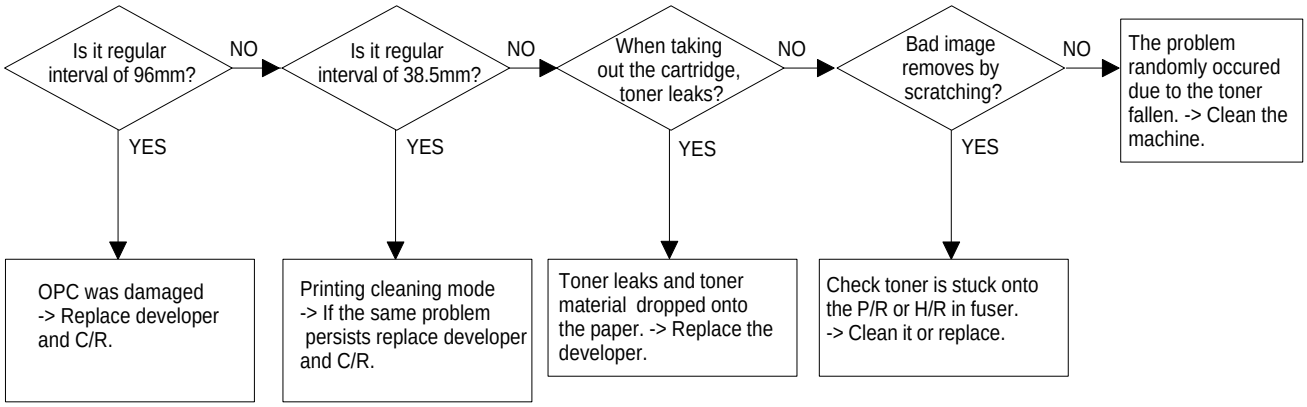
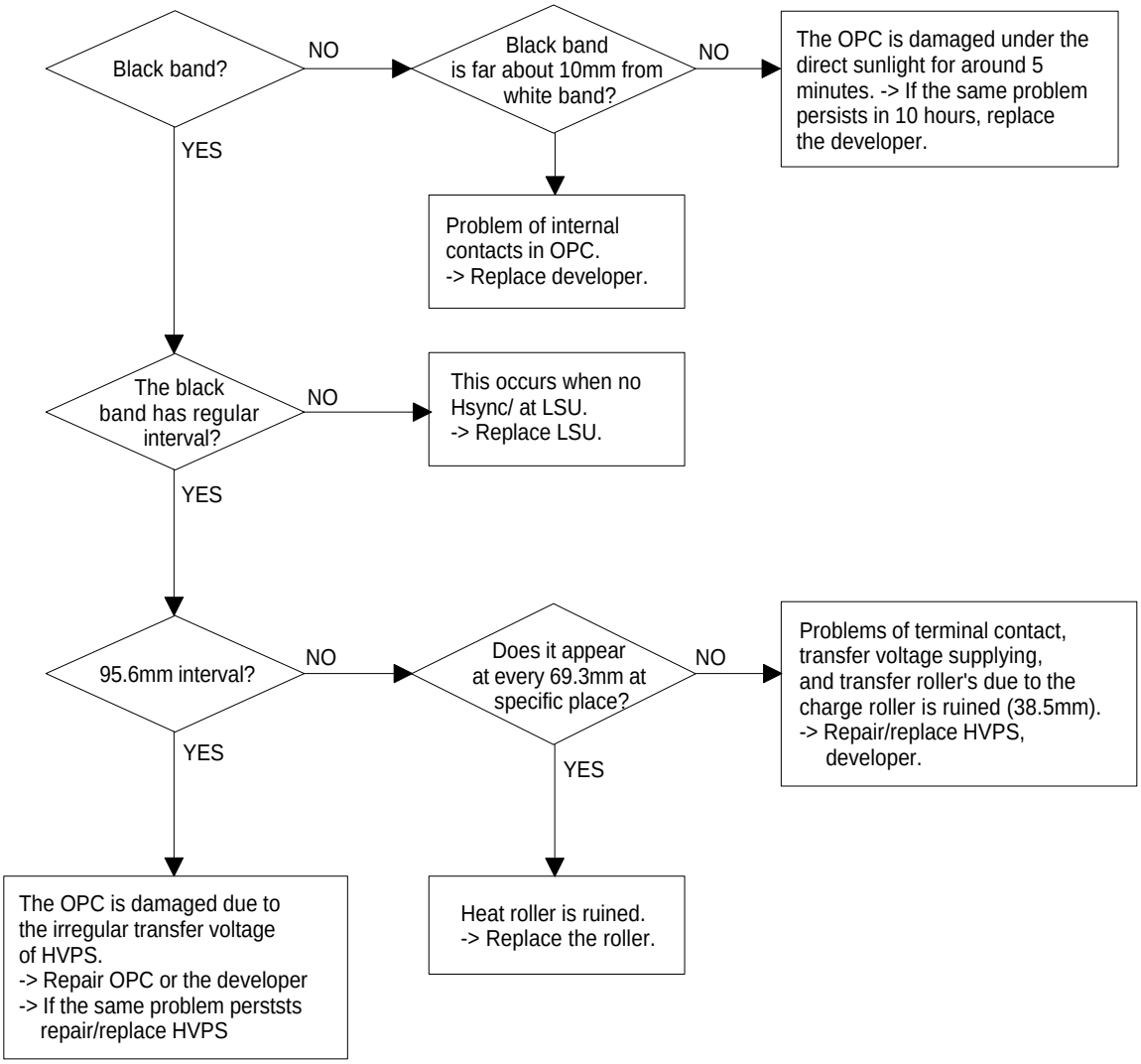
4-3-7 Black Dot


Is it regular interval of 96mm?
NO
Is it regular interval of 38.5mm?
NO
When taking out the cartridge, toner leaks?
NO
Bad image removes by scratching?
NO
The problem randomly occured due to the toner fallen. -> Clean the machine.
YES
YES
YES
YES
OPC was damaged -> Replace developer and C/R.
Printing cleaning mode -> If the same problem persists replace developer and C/R.
Toner leaks and toner material dropped onto the paper. -> Replace the developer.
Check toner is stuck onto the P/R or H/R in fuser. -> Clean it or replace.

4-3-8 Horizontal Band


Black band?
NO
Black band is far about 10mm from white band?
NO
The OPC is damaged under the direct sunlight for around 5 minutes. -> If the same problem persists in 10 hours, replace the developer.
YES
Problem of internal contacts in OPC. -> Replace developer.
The black band has regular interval?
NO
This occurs when no Hsync/ at LSU. -> Replace LSU.
YES
95.6mm interval?
NO
Does it appear at every 69.3mm at specific place?
NO
Problems of terminal contact, transfer voltage supplying, and transfer roller's due to the charge roller is ruined (38.5mm). -> Repair/replace HVPS, developer.
YES
YES
The OPC is damaged due to the irregular transfer voltage of HVPS. -> Repair OPC or the developer -> If the same problem perststs repair/replace HVPS
Heat roller is ruined. -> Replace the roller.

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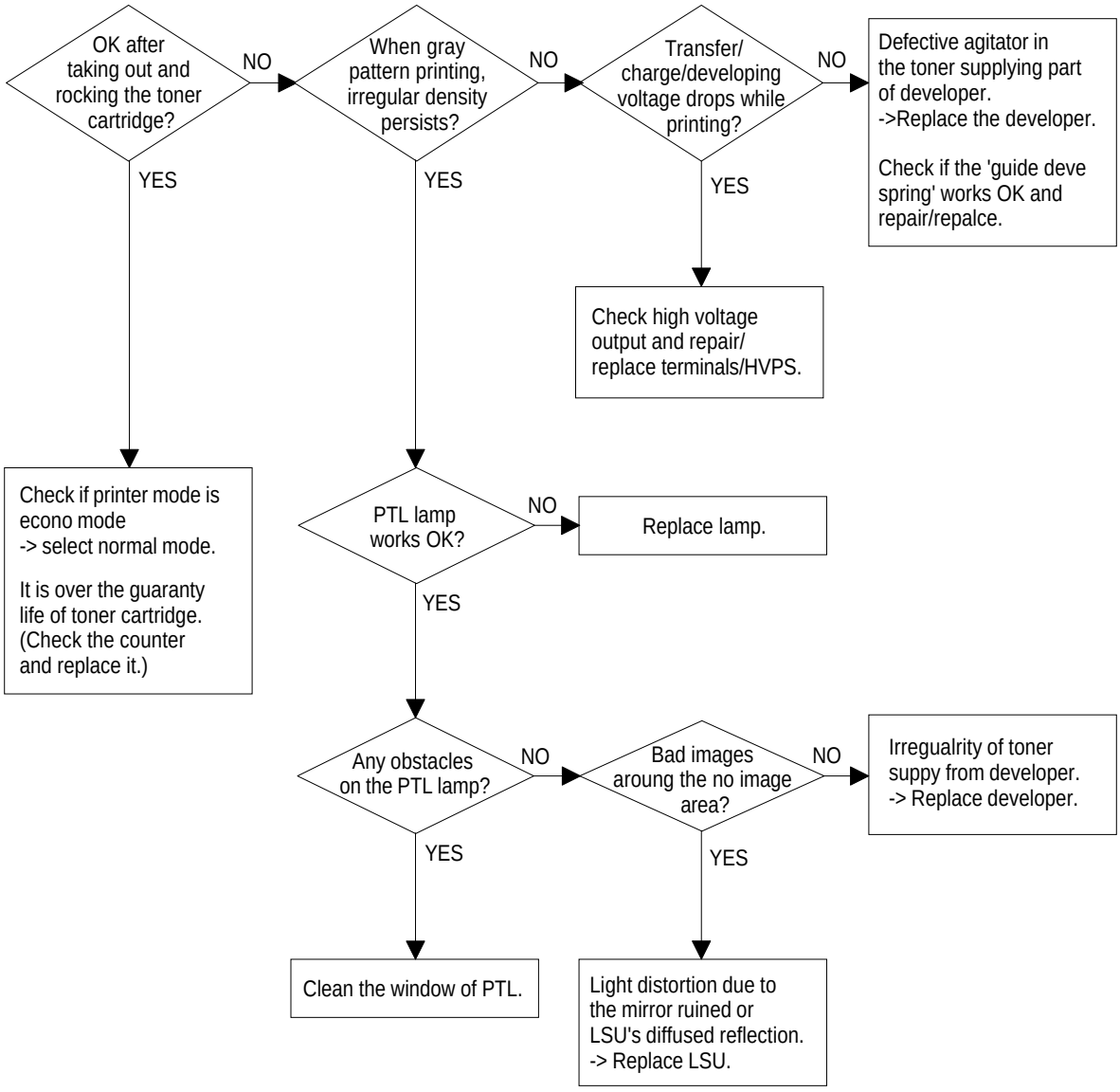
4-3-9 Irregular Density


OK after taking out and rocking the toner cartridge?
NO
When gray pattern printing, irregular density persists?
NO
Transfer/ charge/developing voltage drops while printing?
NO
Defective agitator in the toner supplying part of developer.
->Replace the developer.
Check if the 'guide deve spring' works OK and repair/repalce.
YES
YES
YES
Check high voltage output and repair/ replace terminals/HVPS.
Check if printer mode is econo mode
-> select normal mode.
It is over the guaranty life of toner cartridge. (Check the counter and replace it.)
PTL lamp works OK?
NO
Replace lamp.
YES
Any obstacles on the PTL lamp?
NO
Bad images aroung the no image area?
NO
Irregualrity of toner suppy from developer.
-> Replace developer.
YES
YES
Clean the window of PTL.
Light distortion due to the mirror ruined or LSU's diffused reflection.
-> Replace LSU.

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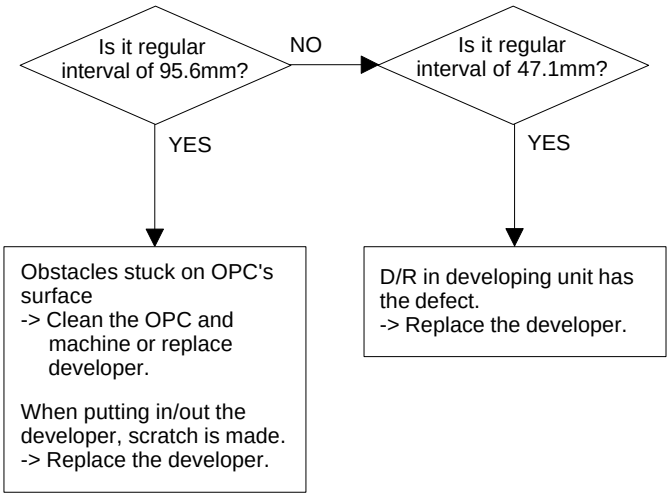
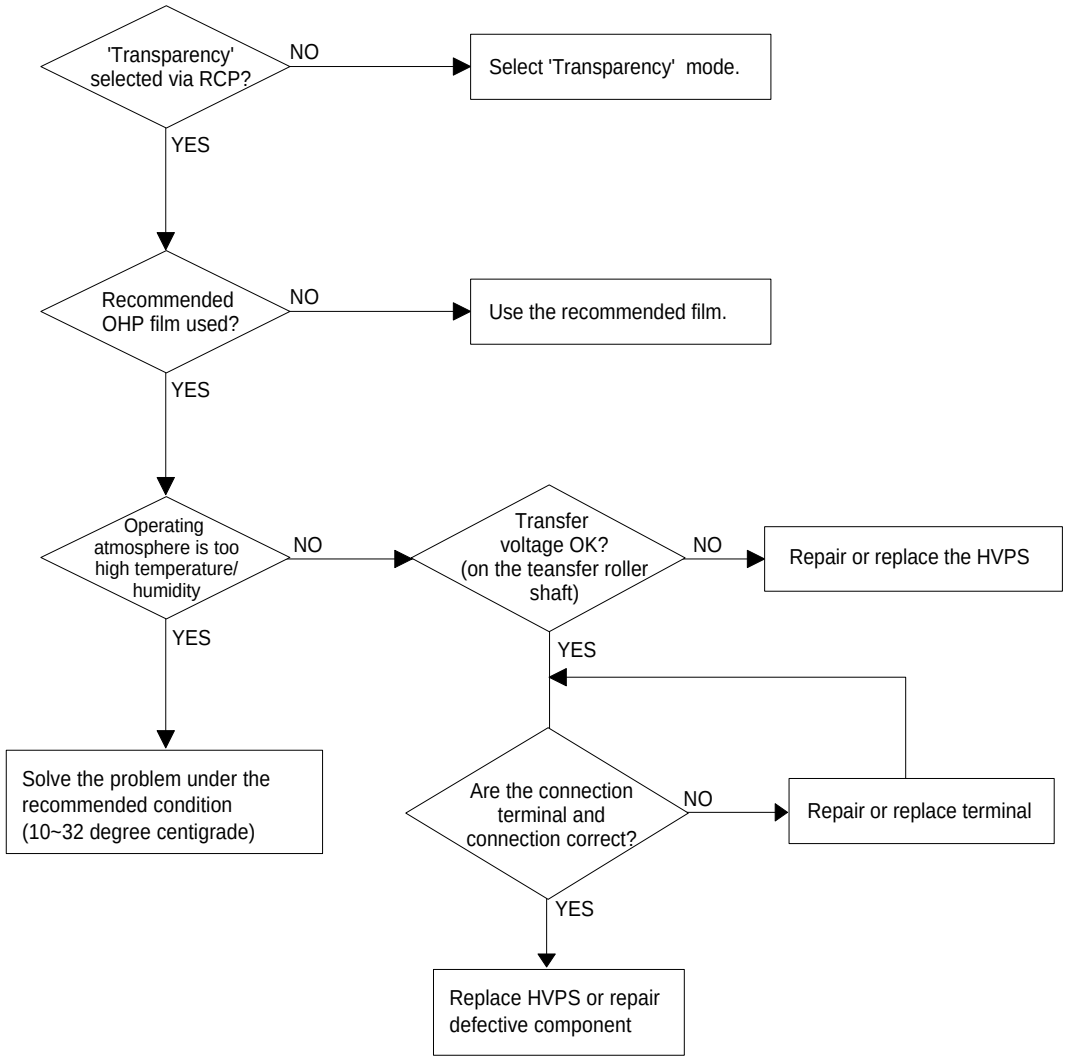
4-3-10 White Spot


Is it regular interval of 95.6mm?
NO
Is it regular interval of 47.1mm?
YES
YES
Obstacles stuck on OPC's surface
-> Clean the OPC and machine or replace developer.
When putting in/out the developer, scratch is made.
-> Replace the developer.
D/R in developing unit has the defect.
-> Replace the developer.

4-3-11 Trembling at the End When OHP Printing



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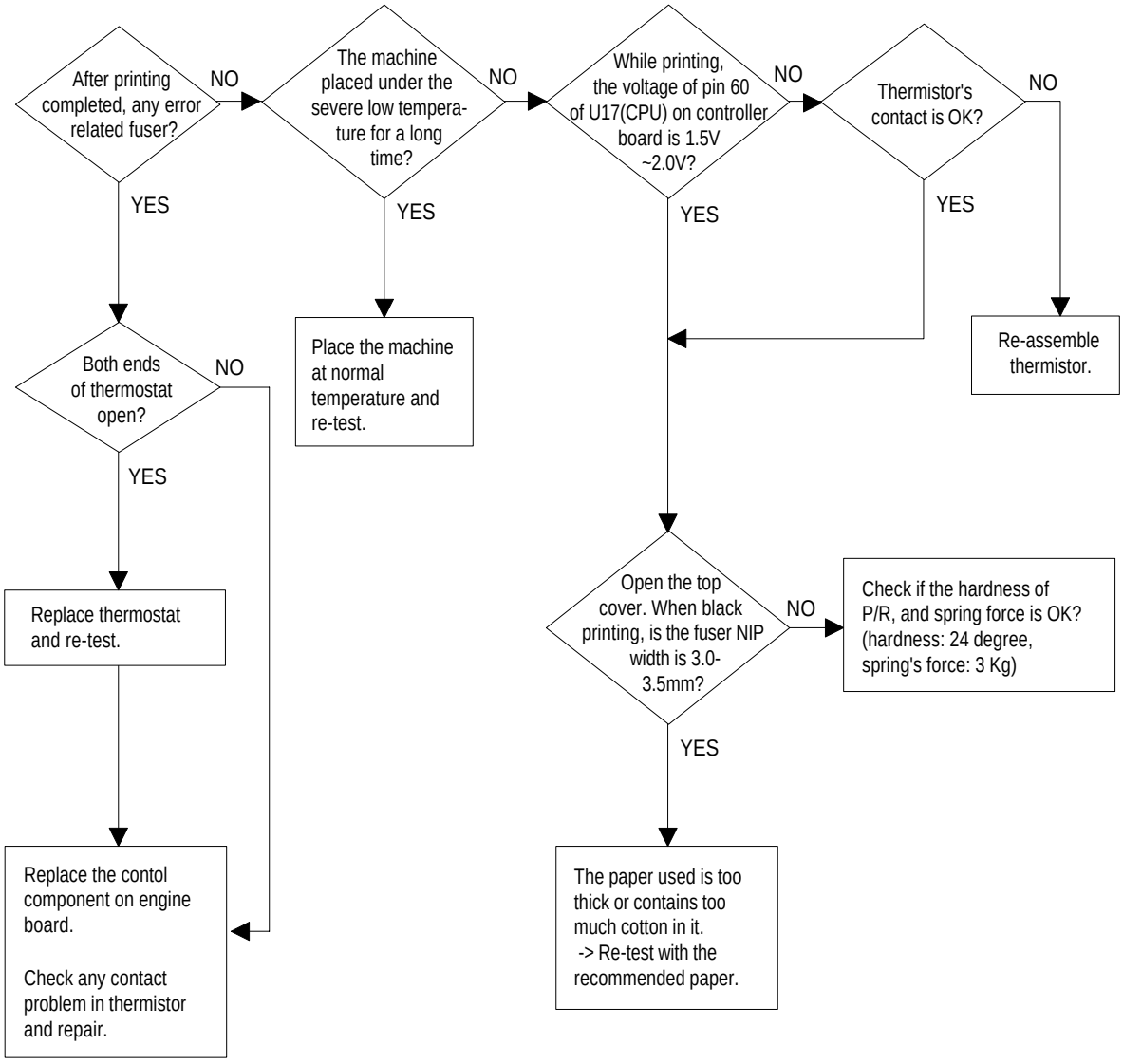
4-3-12 Poor Fusing Grade


After printing completed, any error related fuser?
NO
The machine placed under the severe low tempera-ture for a long time?
NO
While printing, the voltage of pin 60 of U17(CPU) on controller board is 1.5V ~2.0V?
NO
Thermistor's contact is OK?
NO
YES
YES
YES
YES
Re-assemble thermistor.
Place the machine at normal temperature and re-test.
Both ends of thermostat open?
NO
YES
Replace thermostat and re-test.
Open the top cover. When black printing, is the fuser NIP width is 3.0-3.5mm?
NO
Check if the hardness of P/R, and spring force is OK? (hardness: 24 degree, spring's force: 3 Kg)
YES
Replace the contol component on engine board.
Check any contact problem in thermistor and repair.
The paper used is too thick or contains too much cotton in it.
-> Re-test with the recommended paper.

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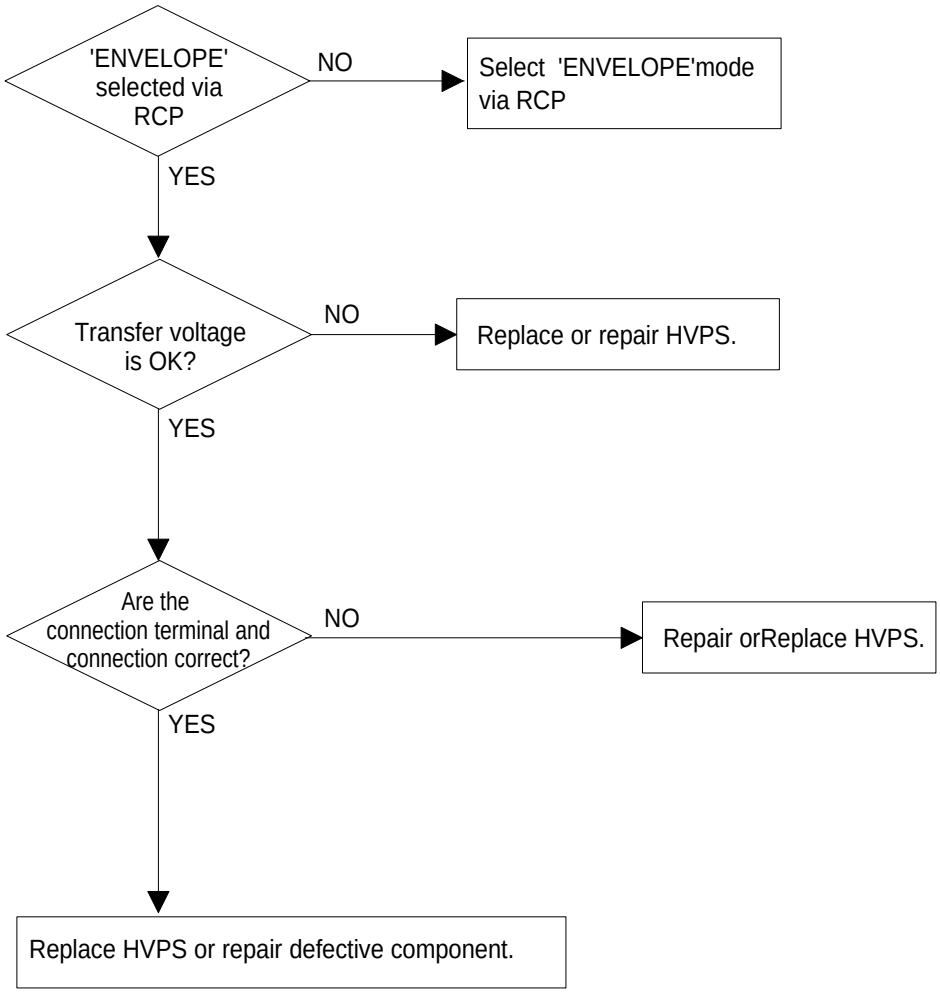
4-3-13 Poor transfer and poor fusing when ENVELOPE printing



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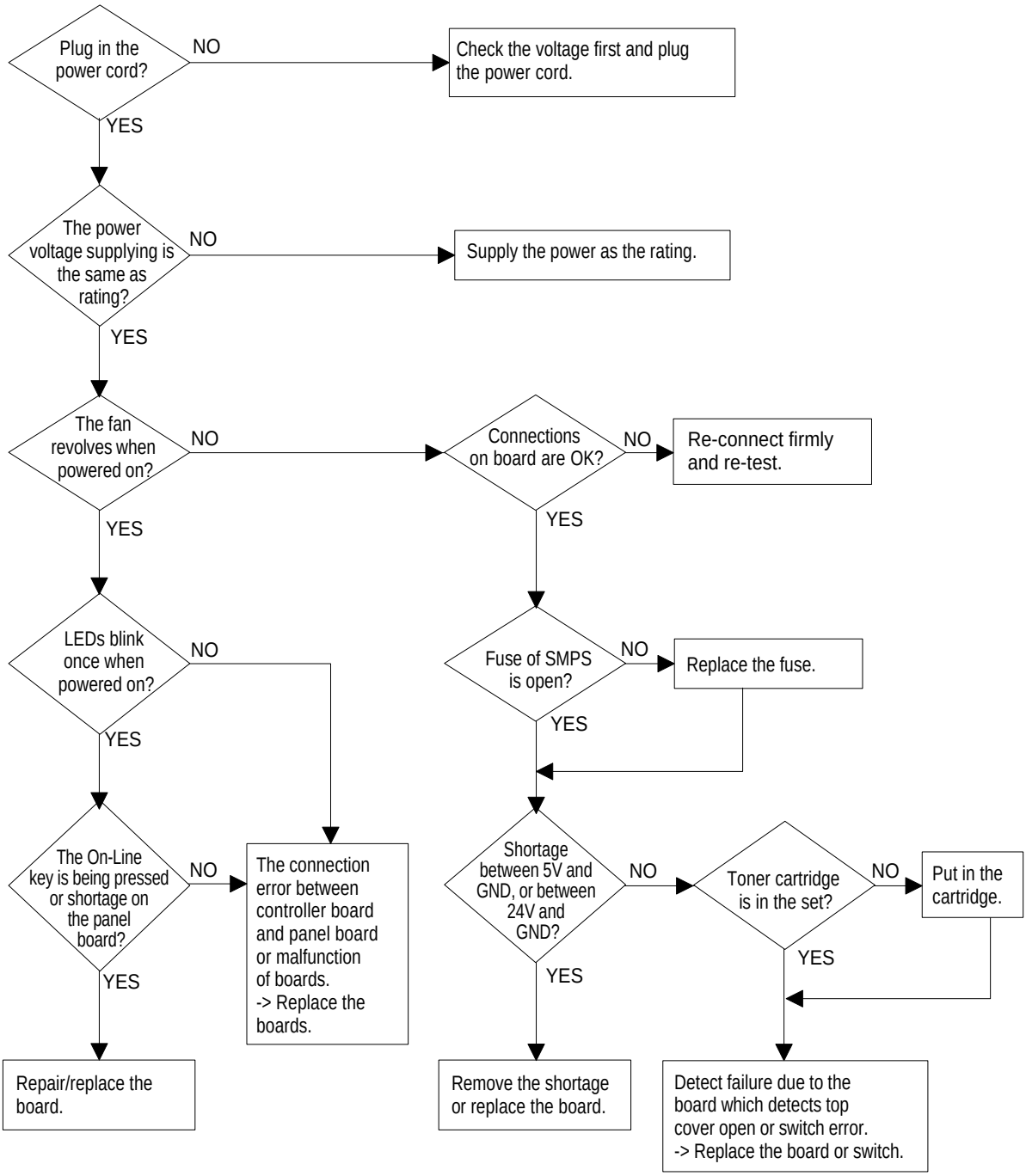
4-4 Malfunction

4-4-1 No Power (LED Off)


Plug in the power cord?
NO
Check the voltage first and plug the power cord.
YES
The power voltage supplying is the same as rating?
NO
Supply the power as the rating.
YES
The fan revolves when powered on?
NO
Connections on board are OK?
NO
Re-connect firmly and re-test.
YES
YES
LEDs blink once when powered on?
NO
Fuse of SMPS is open?
NO
Replace the fuse.
YES
YES
The On-Line key is being pressed or shortage on the panel board?
NO
The connection error between controller board and panel board or malfunction of boards.
-> Replace the boards.
Shortage between 5V and GND, or between 24V and GND?
NO
Toner cartridge is in the set?
NO
Put in the cartridge.
YES
YES
YES
Repair/replace the board.
Remove the shortage or replace the board.
Detect failure due to the board which detects top cover open or switch error.
-> Replace the board or switch.

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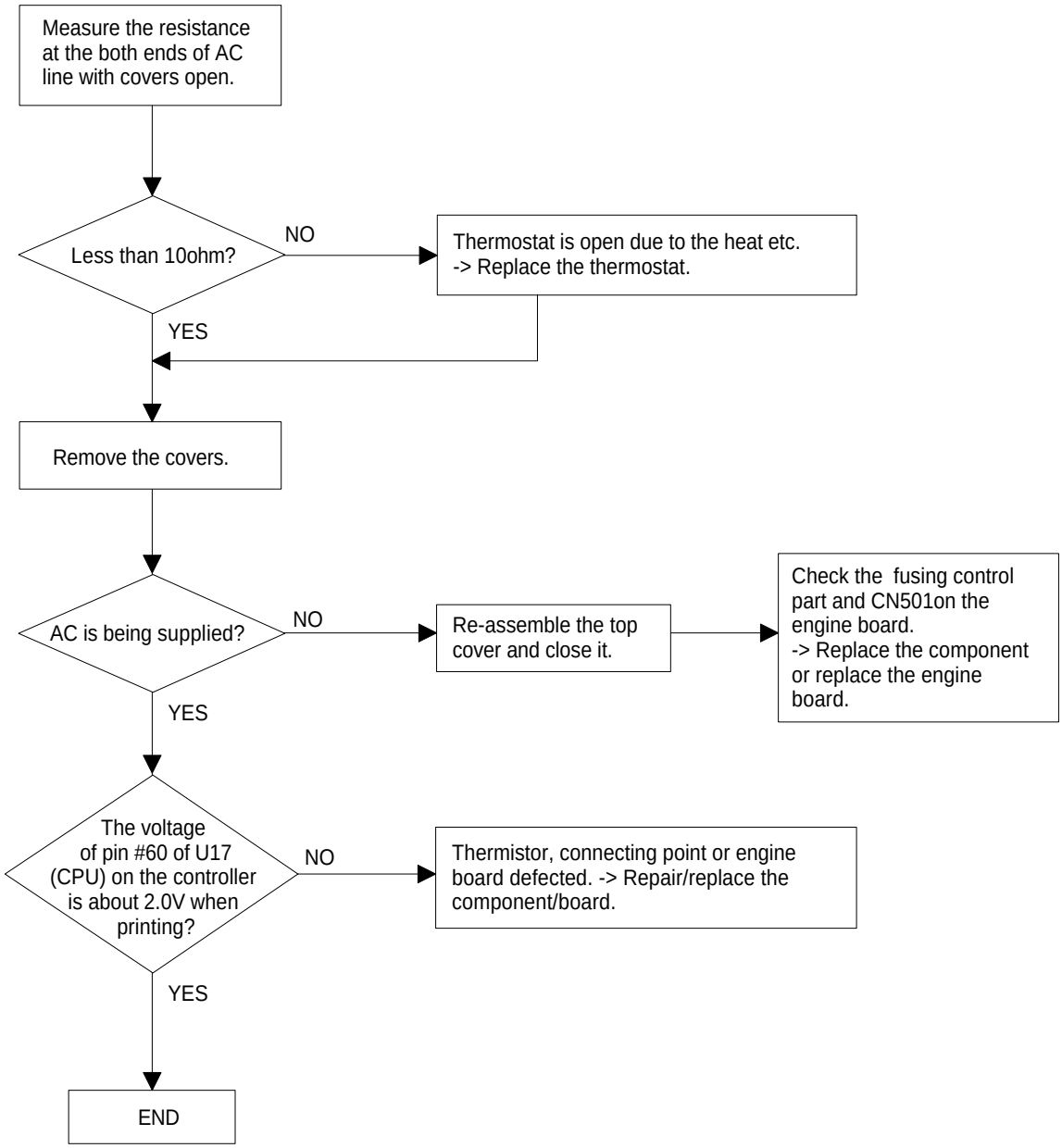
4-4-2 Fuser Error


Measure the resistance at the both ends of AC line with covers open.
Less than 10ohm?
NO
Thermostat is open due to the heat etc. -> Replace the thermostat.
YES
Remove the covers.
AC is being supplied?
NO
Re-assemble the top cover and close it.
Check the fusing control part and CN501on the engine board. -> Replace the component or replace the engine board.
YES
The voltage of pin #60 of U17 (CPU) on the controller is about 2.0V when printing?
NO
Thermistor, connecting point or engine board defected. -> Repair/replace the component/board.
YES
END

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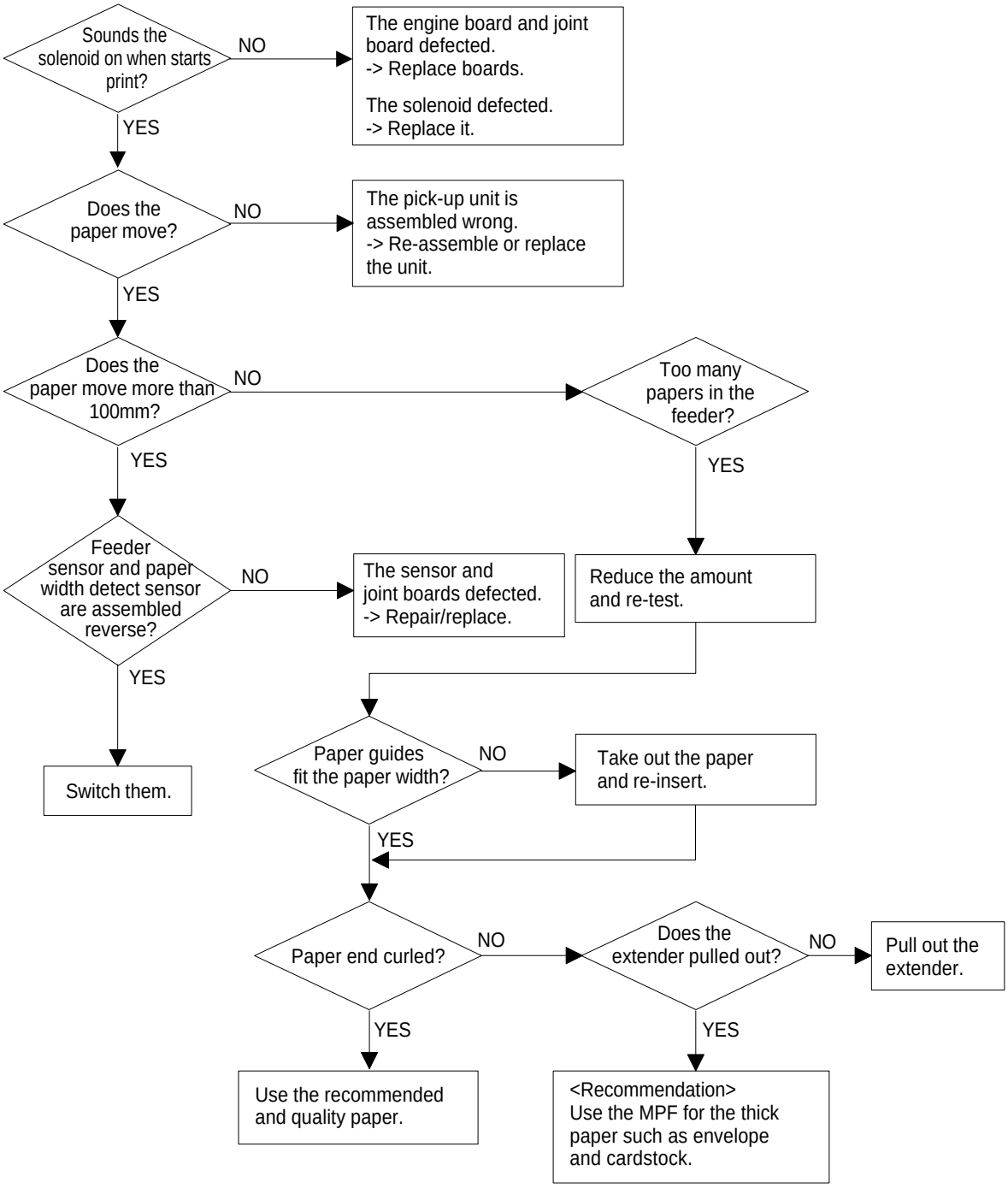
4-4-3 Paper Jam (Mis-feeding)



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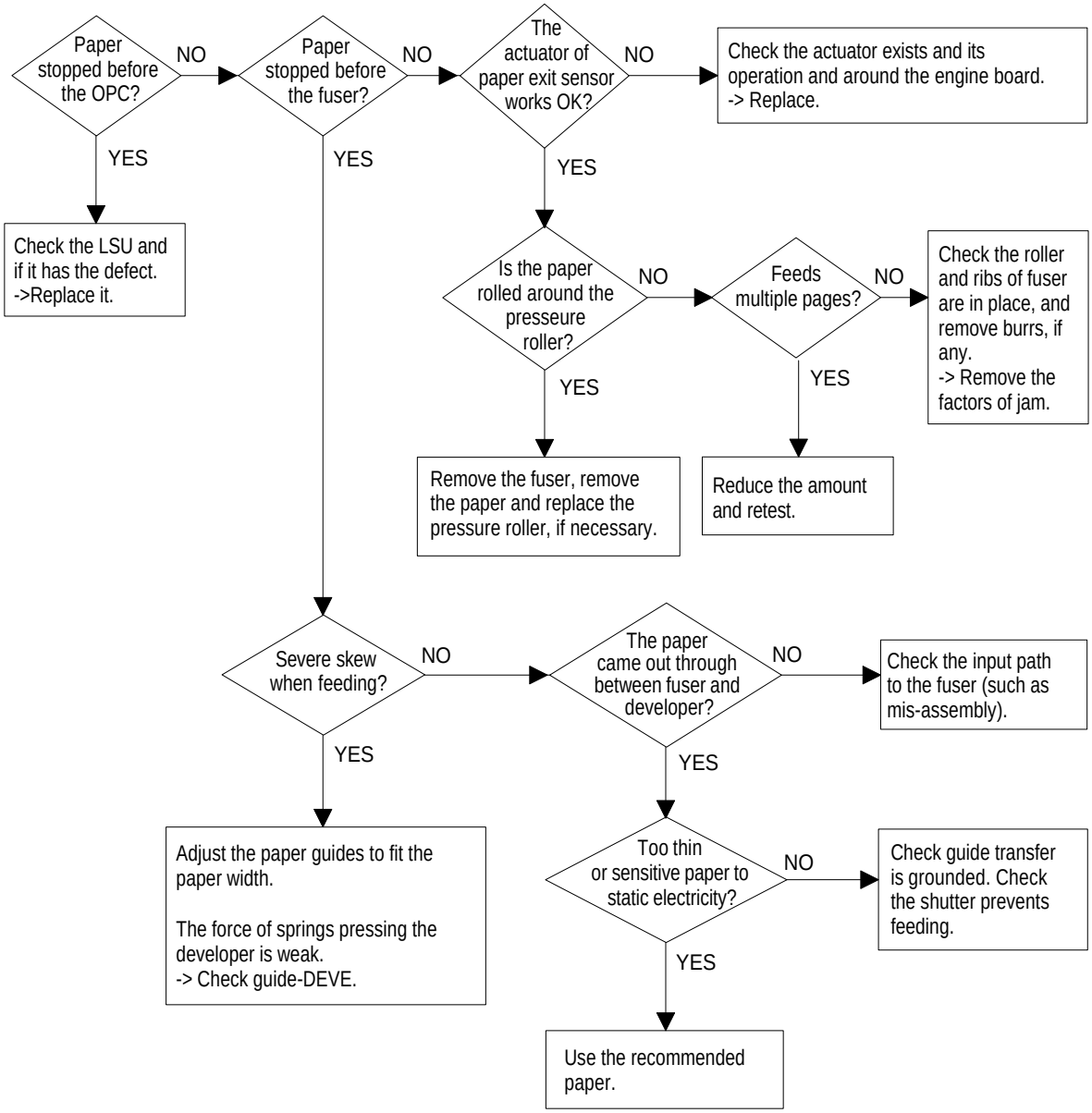
4-4-4 Paper Jam (Jam 1)


Paper stopped before the OPC?
NO
Paper stopped before the fuser?
NO
The actuator of paper exit sensor works OK?
NO
Check the actuator exists and its operation and around the engine board.
-> Replace.
YES
YES
YES
Check the LSU and if it has the defect.
->Replace it.
Is the paper rolled around the presseure roller?
NO
Feeds multiple pages?
NO
Check the roller and ribs of fuser are in place, and remove burrs, if any.
-> Remove the factors of jam.
YES
YES
Remove the fuser, remove the paper and replace the pressure roller, if necessary.
Reduce the amount and retest.
Severe skew when feeding?
NO
The paper came out through between fuser and developer?
NO
Check the input path to the fuser (such as mis-assembly).
YES
YES
Adjust the paper guides to fit the paper width.
The force of springs pressing the developer is weak.
-> Check guide-DEVE.
Too thin or sensitive paper to static electricity?
NO
Check guide transfer is grounded. Check the shutter prevents feeding.
YES
Use the recommended paper.

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3. Disassembly and Reassembly

3-1 General Precautions on Disassembly

When you disassemble and reassemble components, you must use extreme caution. The close proximity of cables to moving parts makes proper routing a must. If components are removed, any cables disturbed by the procedure must be restored as close as possible to their original positions. Before removing any component from the machine, note the cable routing that will be affected.

Whenever servicing the machine, you must perform as follows:

1. Remove the paper cassette(s), and the print cartridge. Do not expose the cartridge to direct room light or sun light, and be careful not to scratch the drum surface.

2. Turn the power switch off.

3. Unplug all the cables from the printer.

4. Replace with only an authorized component.

5. Do not force to open or fasten a plastic material component.

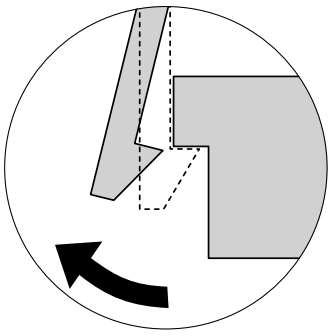
6. Be careful no obstacles are included when you reassemble components.

7. When you reassemble components, be careful small size components are located in place.

8. If you turn the machine over to replace some parts, toner or paper particles may contaminate the LSU window. Protect the LSU window with clean paper.

Releasing Plastic Latches

Many of the parts are held in place with plastic latches. The latches break easily; release them carefully. To remove such parts, press the hook end of the latch away from the part to which it is latched.



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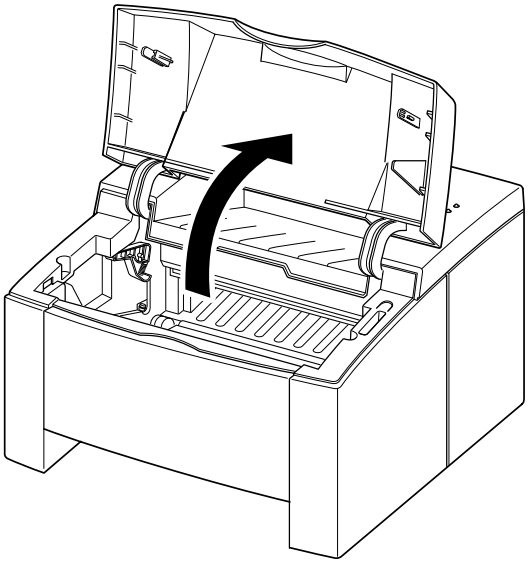
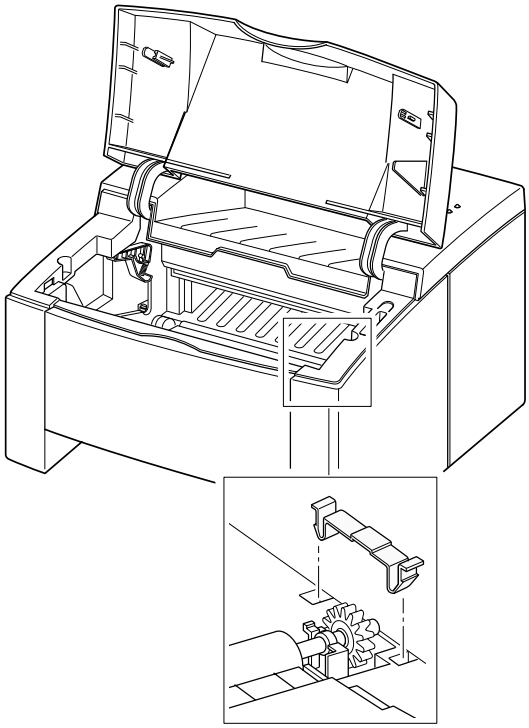
3-2 Transfer Roller

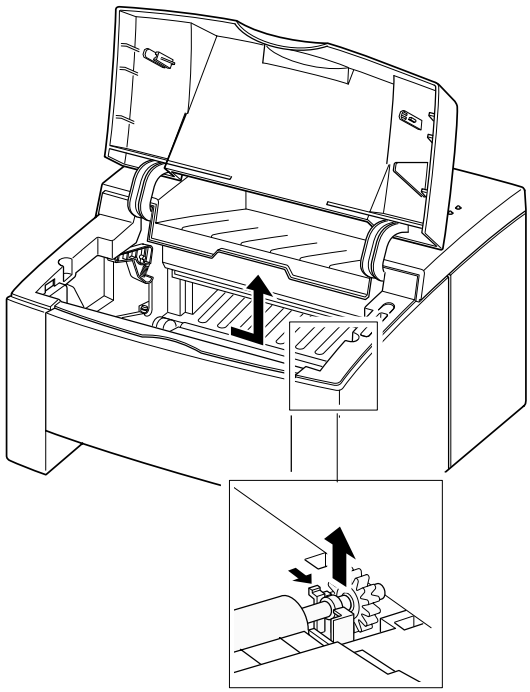
1. Open the printer cover.



2. Remove the cap.



3. Hold the cap at the both end of the roller, then remove the roller.



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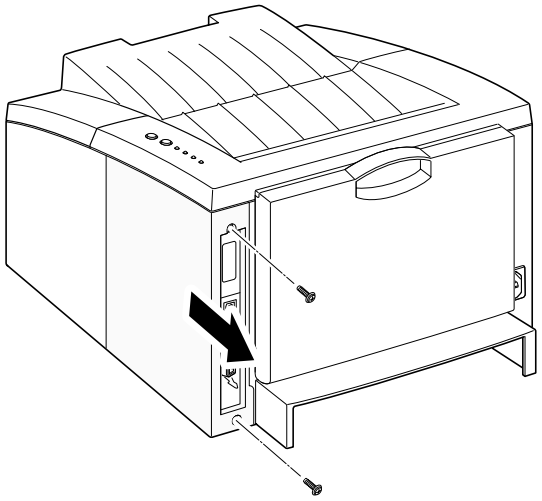
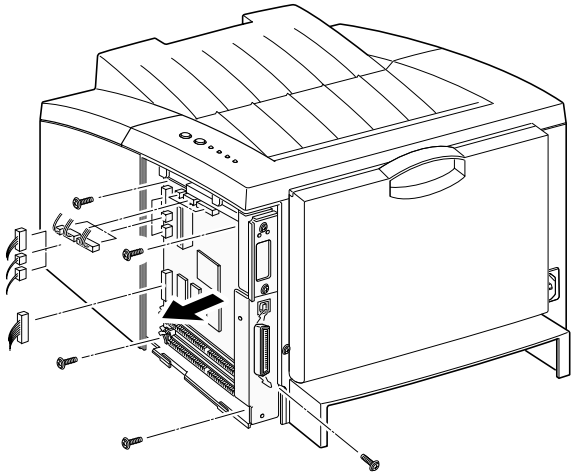
3-3 Controller Board

1. Remove two screws and remove the controller board.



2. Remove five screws securing the board and unplug all connectors, and then take the controller board out of the printer.



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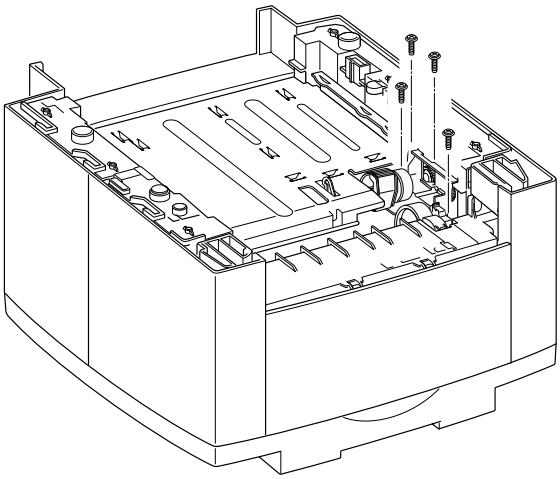
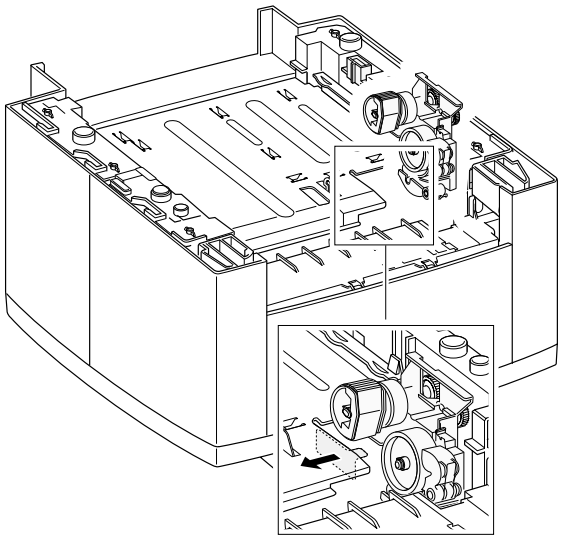
3-4 Pickup Assembly

1. Remove four screws securing the pickup assembly.

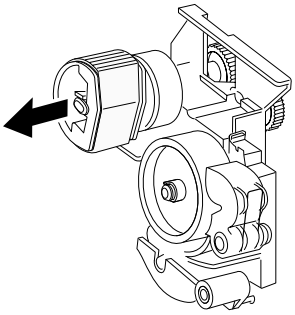


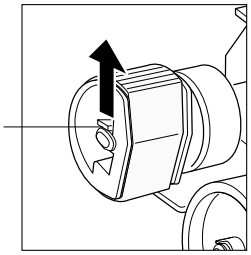
2. Take the assembly out.



Push the solenoid if you have difficulty to remove the pickup assembly.

3. Check the pickup rubber wear. If the rubber is heavily worn, replace it with a new one.





Squeeze this tab to remove the rubber.

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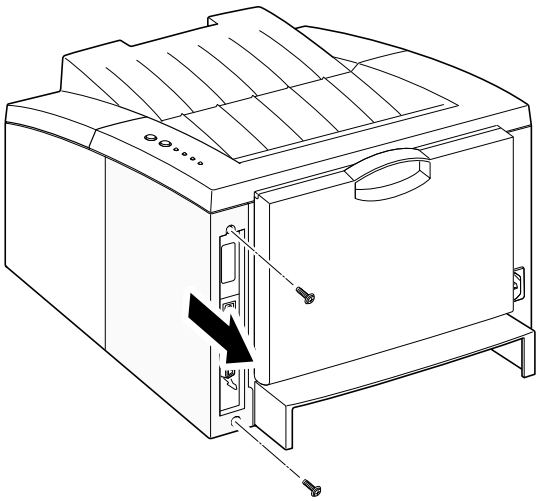
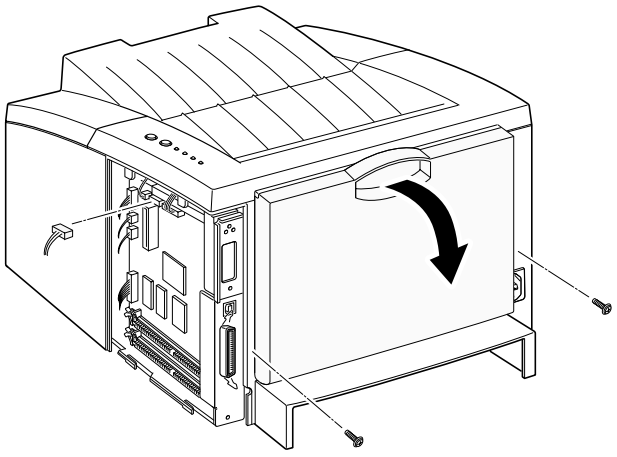
3-5 Main Cover

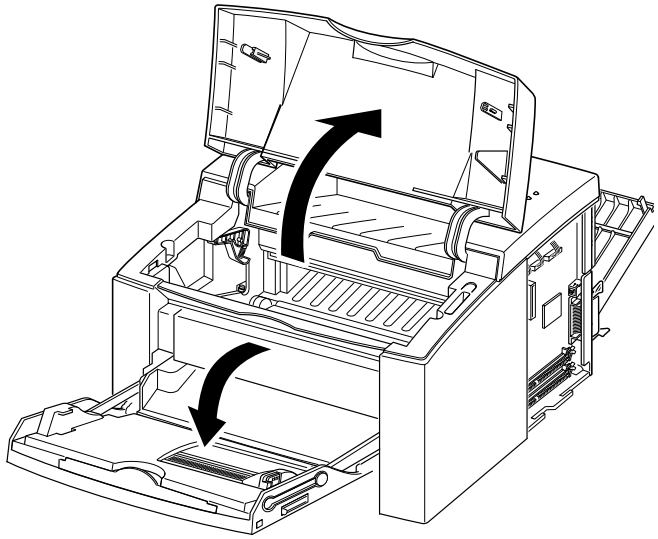
1. Remove two screws and remove the controller board.



2. Remove two screws at the back of the printer and unplug one connector from the board, then open the rear cover.



3. Open the printer cover, and open the MP tray.



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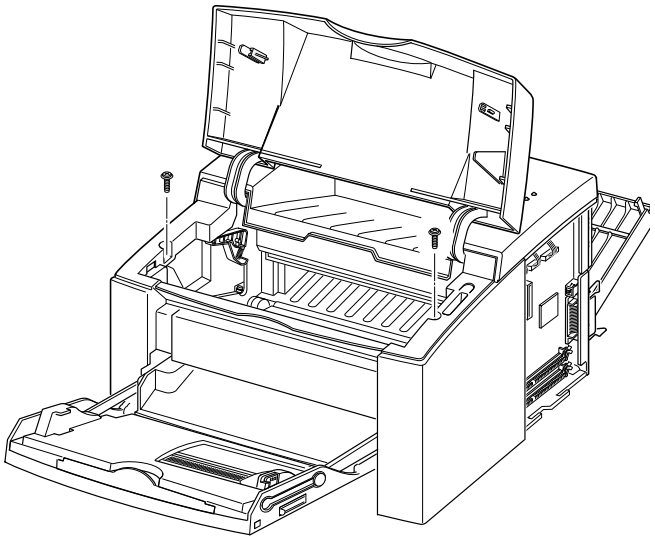
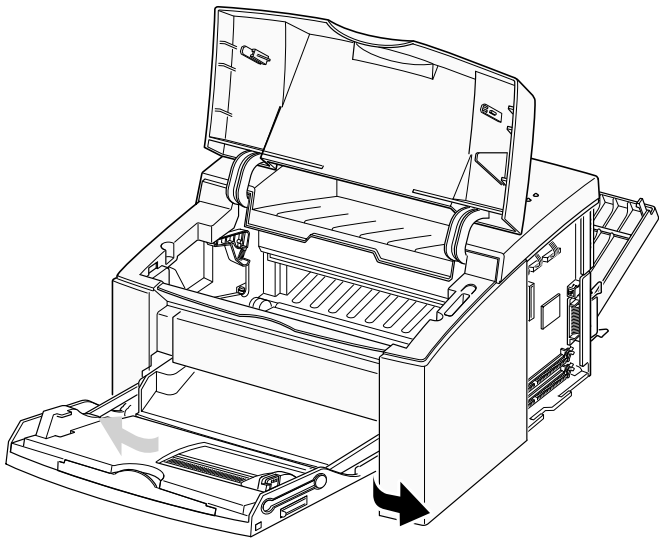
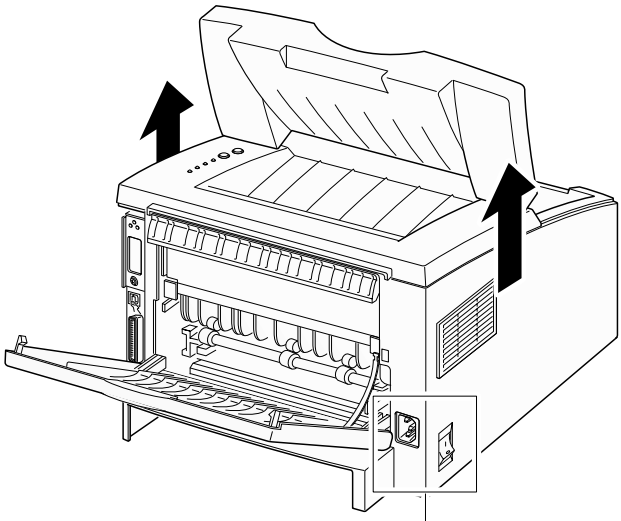
4. Remove two screws securing the main cover.



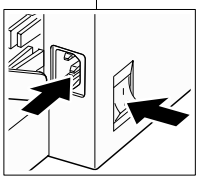
5. Unlatch the front ends of the cover.



6. Slide the main cover upward, out of the printer.



Note that the power switch and the power connecter are properly released when you remove the cover.



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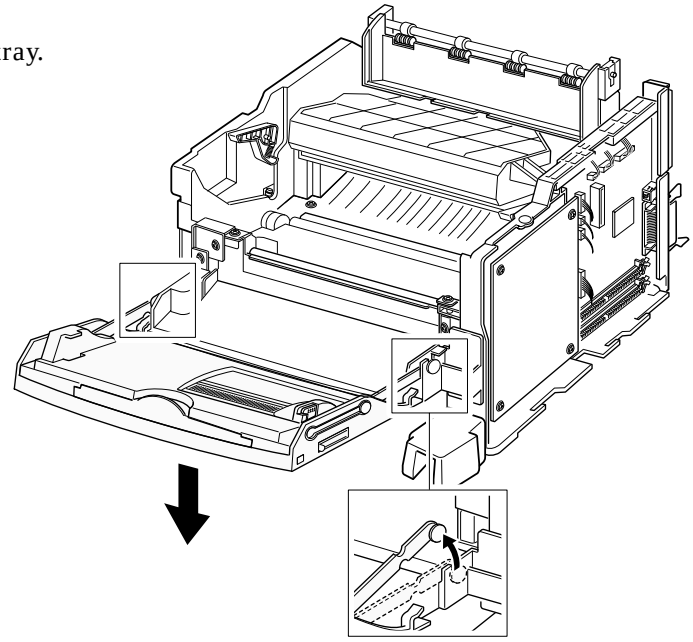
3-6 MP (Multi-Purpose) Tray

1. Before you remove the MP tray, you should remove:

   -Main Cover (see page 3-5)

2. Remove the stoppers securing the MP tray.



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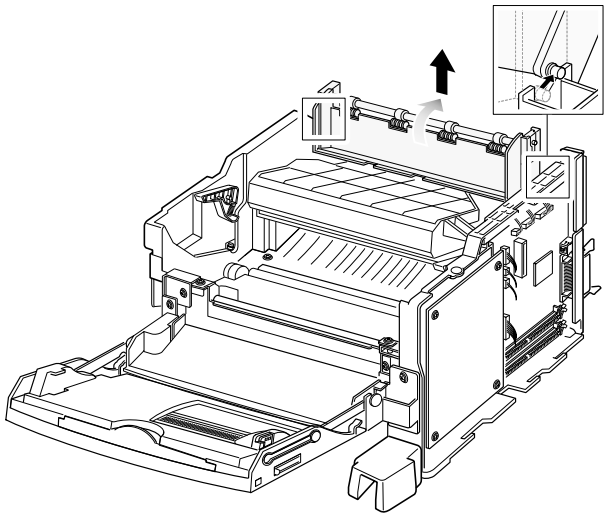
3-7 Exit Assembly

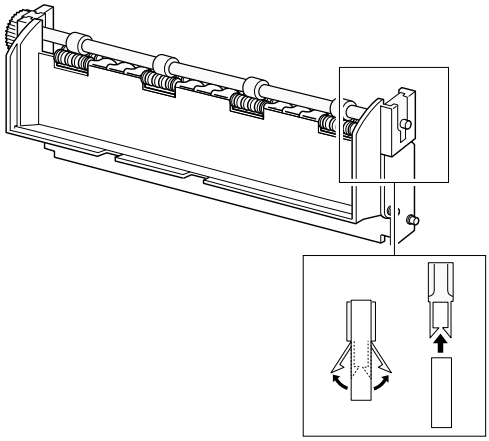
1. Before you remove the exit assembly, you should remove:

   -Main Cover (see page 3-5)

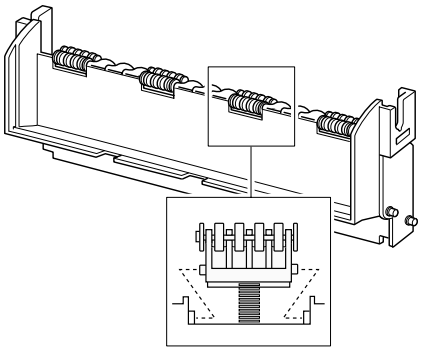
2. Remove the exit tray in the direction of arrow.



3. If you want to remove the roller shaft, unlatch both ends of the shaft and take it out.



4. If you want to remove the exit roller, sqeeze the bottom of the roller and take it out.



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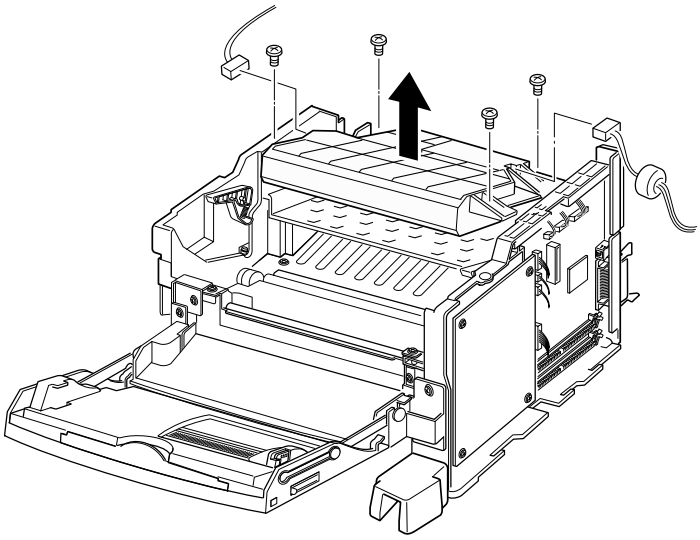
3-8 LSU

1. Before you remove the LSU, you should remove:

   -Main Cover (see page 3-5)
   -Exit assembly (see page above)

2. Remove four screws, and remove the LSU. Then unplug two connectors from the LSU.

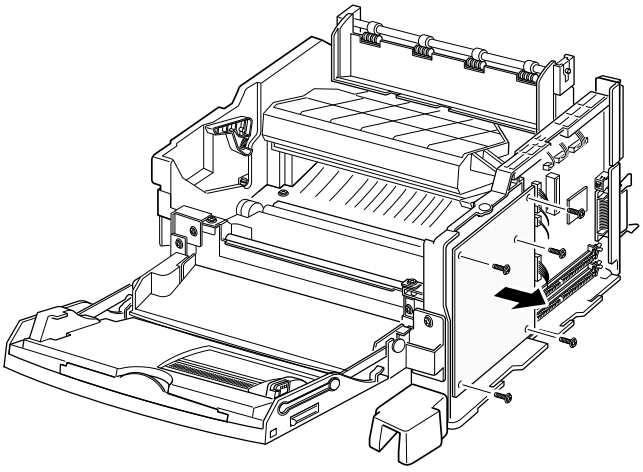


3-9 HVPS board

1. Before you remove the HVPS board, you should remove:

   -Main Cover (see page 3-5)

2. Remove five screws and take the HVPS board and HVPS cover out.



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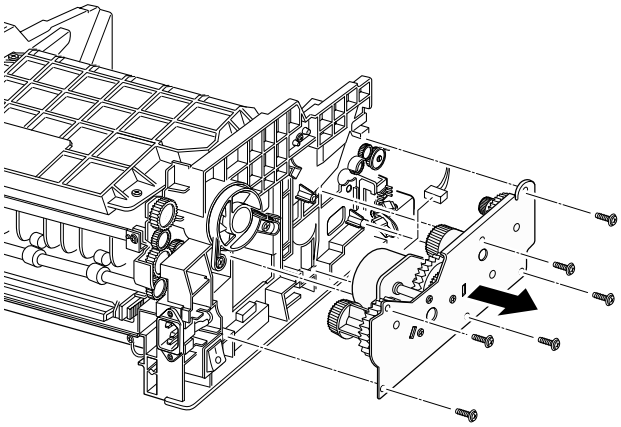
3-10 Drive Assembly

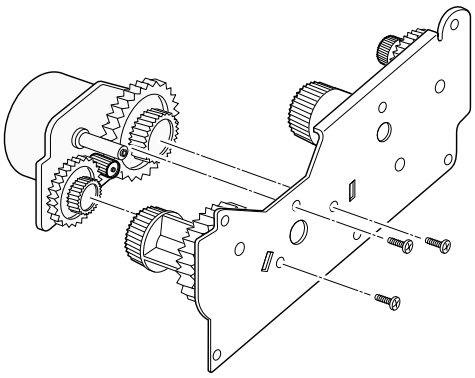
1. Before you remove the drive assembly, you should remove:

   -Main Cover (see page 3-5)

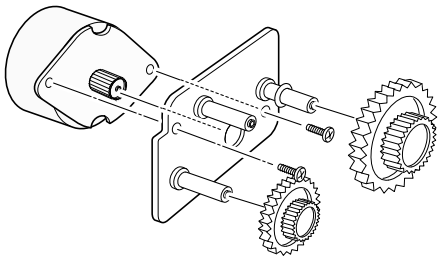
2. Remove six screws securing the drive assembly from the gear bracket and unplug one connector from the motor, and then take the drive assembly out.



3. If you want to remove the motor from the drive assembly, remove three gold screws securing the motor assembly to the gear bracket.



4. Remove the motor assembly. Remove two screws securing the motor to the motor bracket, then take the motor out.



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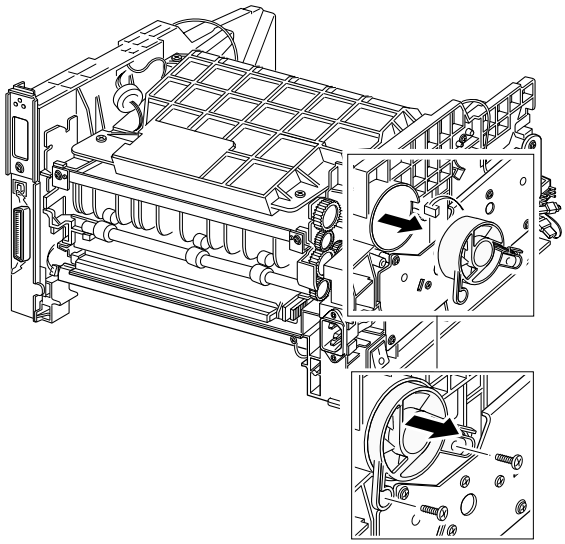
3-11 Fan

1. Before you remove the fan, you should remove:

   -Main Cover (see page 3-5)

2. Remove two screws, and remove the fan. Then unplug one connector.

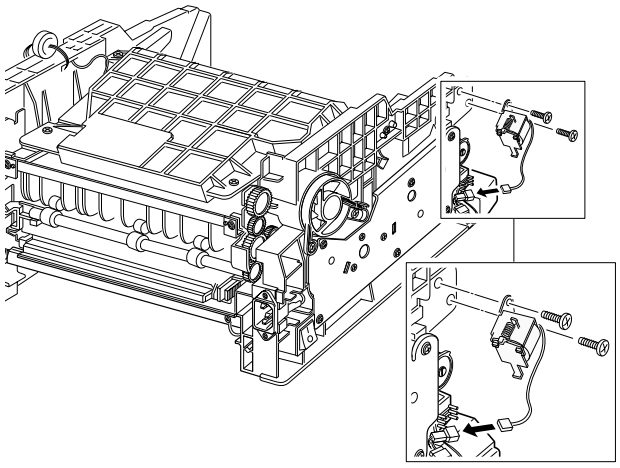


3-12 Solenoid

1. Before you remove the solenoid, you should remove:

   -Main Cover (see page 3-5)

2. Remove two screws, and remove the solenoid. Then unplug one connector.



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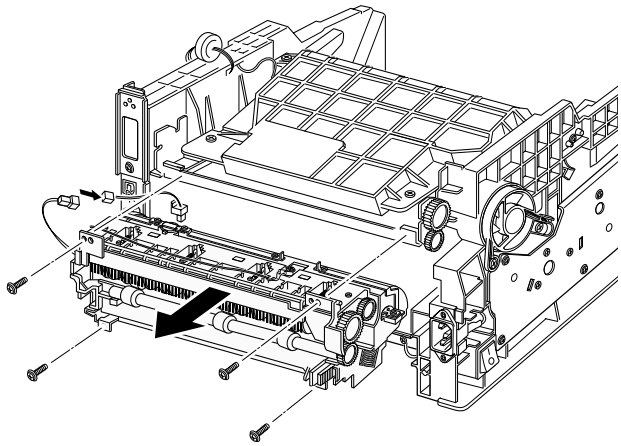
3-13 Fuser Assembly

1. Before you remove the fuser, you should remove:

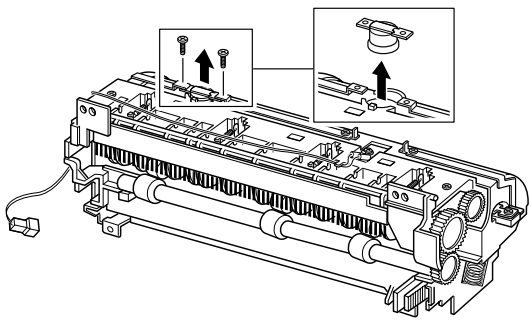
   -Main Cover (see page 3-5)

2. Remove four screws and unplug one connector, and then remove the fuser assembly.



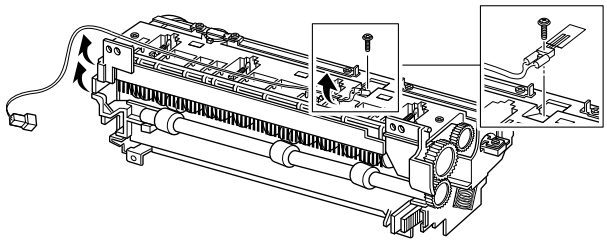
To remove the thermostat from the fuser assembly

Remove two screws and take the thermostat out.



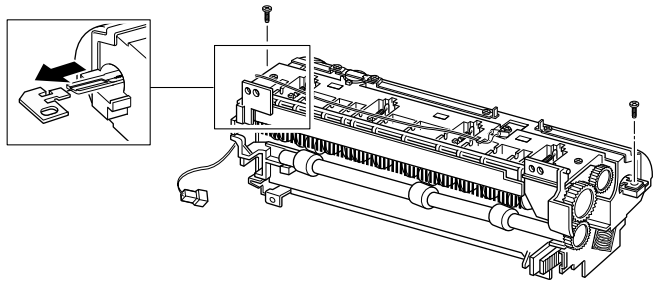
To remove the thermistor from the fuser assembly :

Remove one screw, and release the wire from the three holders, and then take the thermistor out.

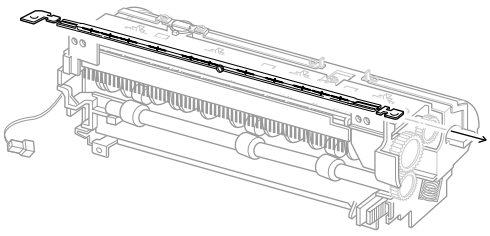


To remove the halogen lamp from the fuser assembly :

Remove two screws and take the halogen lamp out of the fuser assembly.



Note: When you reassemble the halogen lamp, make sure that it is inserted into the slot properly.



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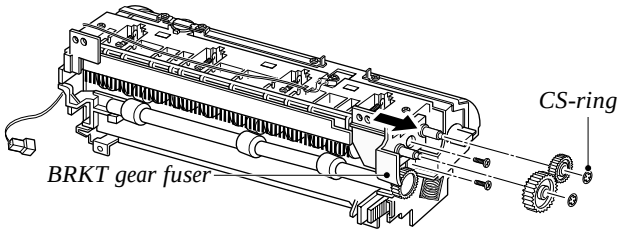
To remove the heat roller from the fuser assembly :

1. Before you remove the guide feed, you should remove:

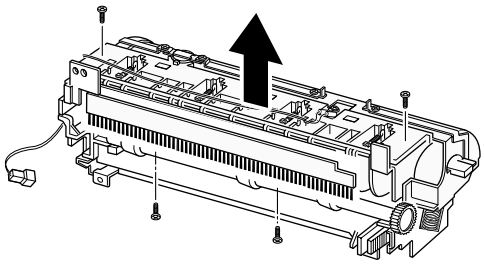
   -Halogen lamp (see page 3-11)

2. Remove two CS-rings and two gears. Then remove two screws securing the BRKT gear fuser and take the gear fuser out.

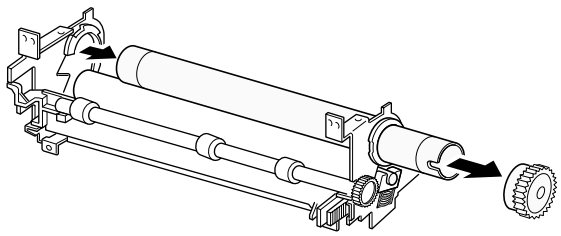


3. Remove two screws and take the cover fuser out.

4. Remove two screws and take the holder brush ant out.

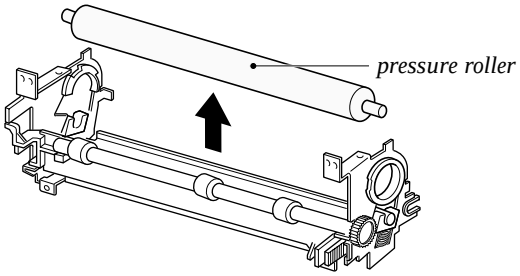


5. Remove the heat roller.



To remove the pressure roller from the fuser assembly :

Remove the roller.



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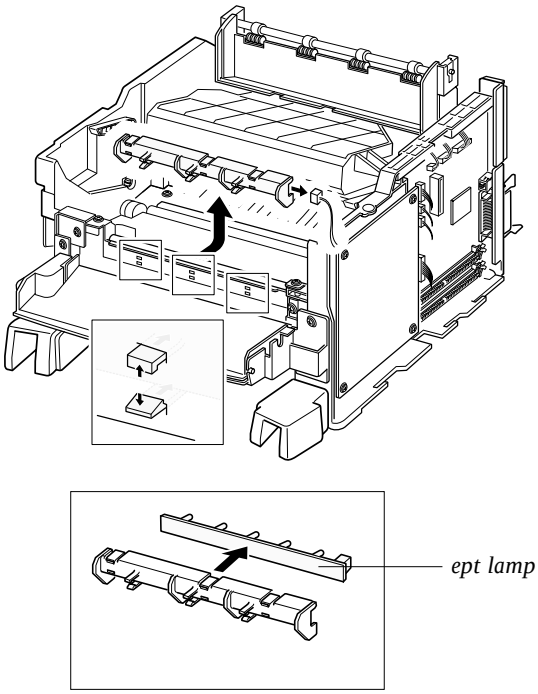
3-14 Feed Guide & PTL Lsmp

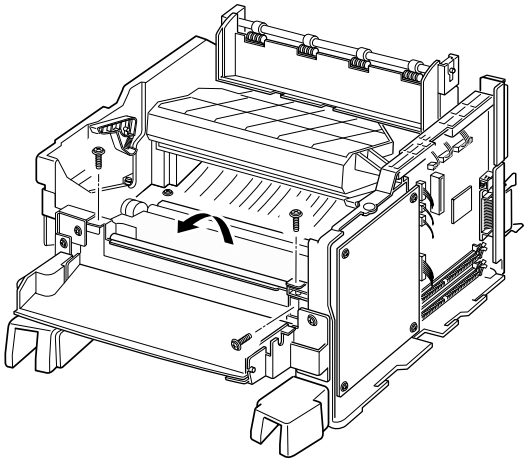
1. Before you remove the guide feed & PTL lamp, you should remove:

   -Main Cover (see page 3-5)

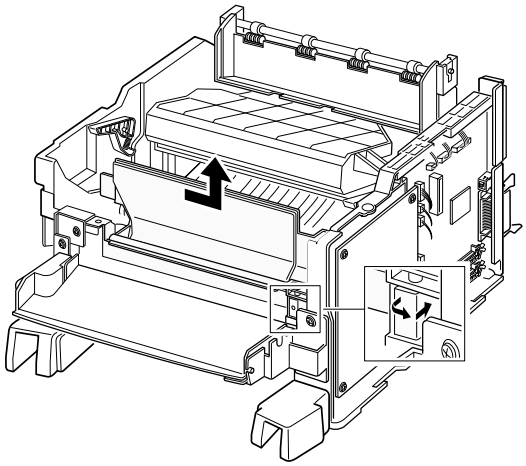
2. Release the latches on the PTL lamp from the MPF ass'y and unplug one connector, then remove the PTL lamp.



3. Remove two screws and raise the feed guide in the direction of arrow.



4. Remove the feed guide .



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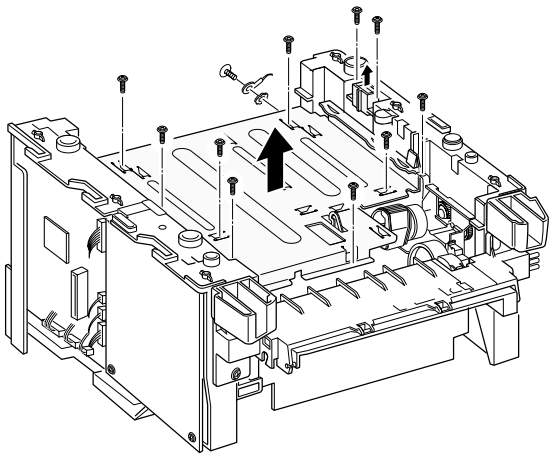
3-15 Engine Board and Miscellaneous

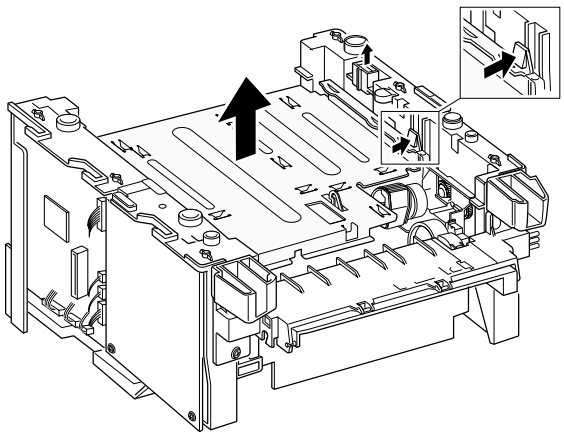
1. Before you remove the engine board, you should remove:

   -Main Cover (see page 3-5)

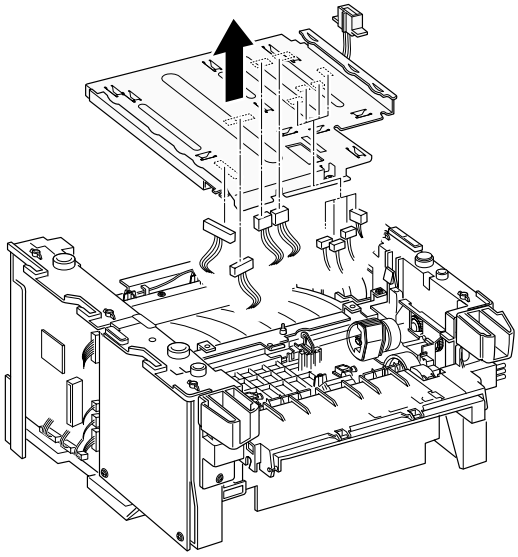
2. Remove nine screws securing the PCU shield and remove two screws securing the SCF connector, and then take the PCU shield out of the printer.



3. While you push the latch to release the PCU shield, take the PCU shield out of the printer.



4. Unplug all connectors from the PCU shield, and remove the shield.



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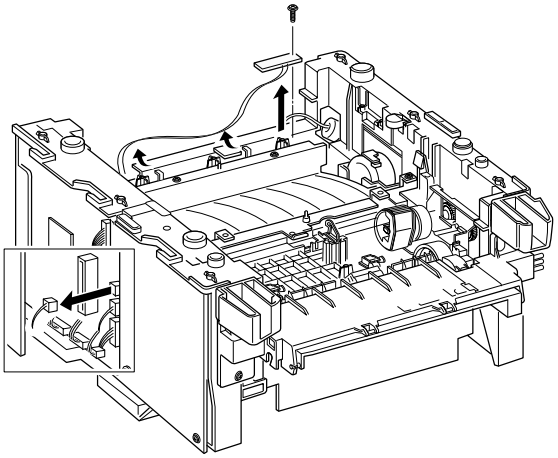
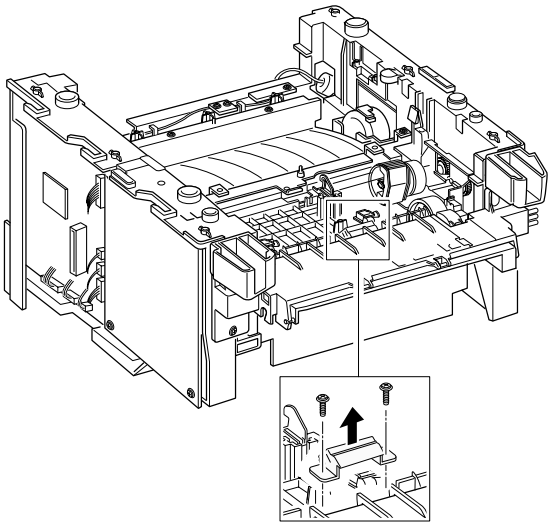
To replace the exit board :

1. Unplug one connector from the controller board and remove one screw securing the board. Then release the wire from two holders and take the board out.



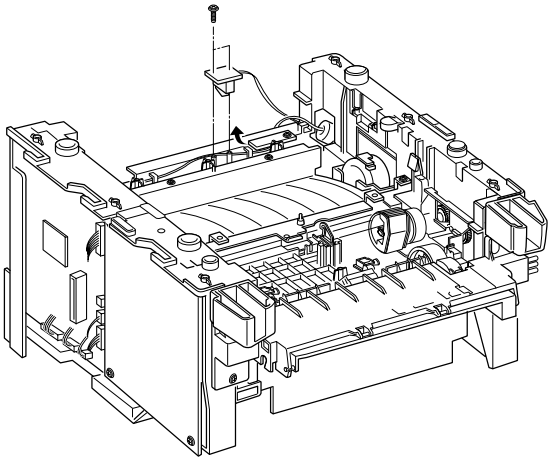
To replace the Cap sensor :

Remove two screws and take it out.



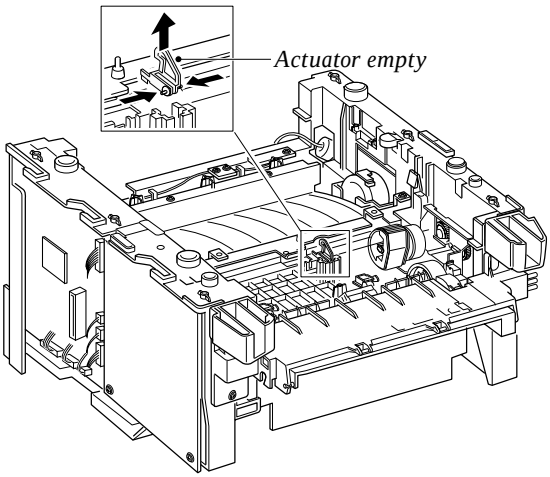
To replace the fuser sensor :

Remove two screws and take it out.



To replace the actuator empty :

Take the sensor out while you squeeze the both ends of the sensor.



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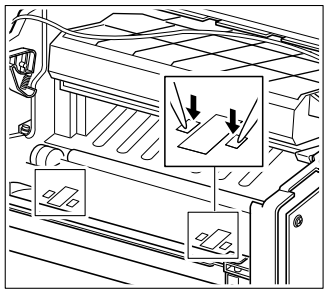
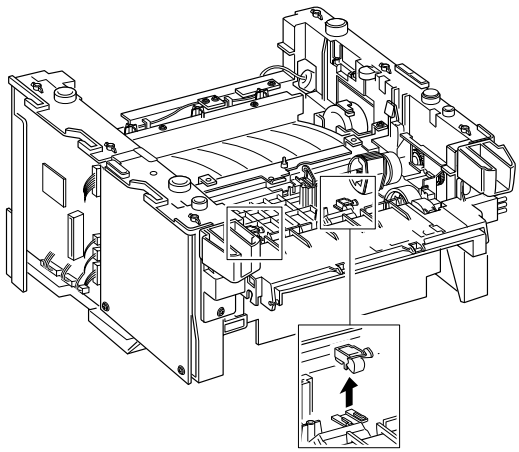
To replace the actuator feed

1. Turn the mechanism back and push down the points as shown to unlatch the actuator feed.

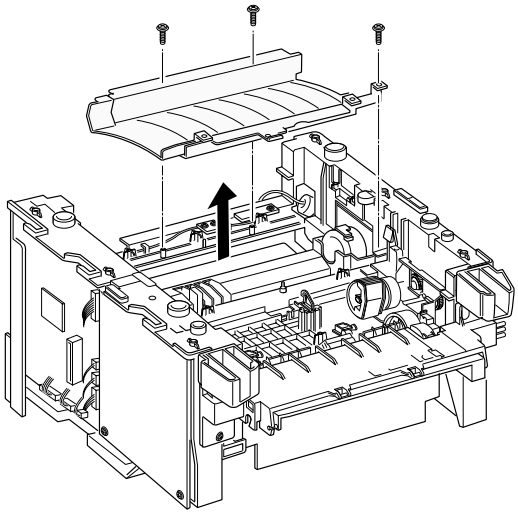


2. Turn the unit over again, and remove the actuator feed.



To remove the transfer guide :

Remove three screws and take the guide out.



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2. Specifications

Note: It is subject to change without notice.

Item	Specification & Description
Engine	ML-6040
Print Speed	12PPM (A4 Size, 5% Character Pattern)
Resolution	True 600 x 600 dpi
Source of Light	Laser Diode (LSU:Laser Scanner Unit) + Electrophotography
Print Method	Non-impact Electrophotography
Feed Method	Cassette & Manual, Option Feeder
Paper Handling (input)	*Size Standard : A4, Letter, Legal, B5, Executive, Folio Paper Type / Paper size(mm^2) Monarch 98.5 x 190.5 Com-10 104.9 x 241.3 Intl-DL 110 x 220 Intl C5 162 x 229 (3) Universal type Length : 150 ~ 356 mm Width : 90 ~ 216 mm *Weigh : For Cassette, 60 ~ 90 g/m^2
Paper Handing (output)	Face Down : 250 sheets, Face Up : 20 sheets
Feed Capacity	Cassette : 250 sheets of paper (75g/m^2)
Warm-up time	30 seconds or less (23°C, 50%)
First Print Time	Tray1 : 15seconds or less
Power Rating	AC100~120V/ 220~240V(±15%), 50/60Hz (±3%)
Power Consumption	During Printing : 250WH (average)
Power Saving	During Sleep : Less than 12W
Consumption	Less than 50W during 1 hour when it turned on
Certification & Compliance	110V : UL,CSA,CDRH,FDA 220V : GS,SEMKO,FIMKO,NEMKO,DEMKO
Acoustic Noise	Stand by : Less than 35dB, Operating : Less than 48dB
Toner Supply	Print Cartridge

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Item	Specification & Description
Printing Area	No-print area : 3mm from edge(Top,Bottom,Left,Right) of listed core media
	No-print area : 3mm from edge(Top,Bottom,Left,Right) of envelope
Operating Environment	Temperature : 10~30°C, Humidity : 20~80%RH
Storage Environment	Temperature : 0~35°C, Humidity : 10~90%RH
Weigh	Net : Max 11Kg, Gross : 12Kg
External Dimension	420 (W) x 368 (D) x 220 (H)mm
Print Cartridge	Life Span : 6,000 pages, 5% Pattern Developing : Non-magnetic Contact Developing Charging : Conductive Roller Charging Density Adjustment : 3 step (Light, Medium, Dark) Toner Supply Method : Exchanging the Developer Toner Checking Sensor : None Transfer System : Conductive Roller Transfer Fusing System : Temperature & Pressure Ozone Emission : Less than 0.1 PPM
Emulation	GDI,PCL4.5
CPU	ARM7 TDMI (clock speed 66MHz)
RAM Memory	Standard : 4M byte
ROM	1M byte (8M bit x 1 : Program) Flash Memory
EEPROM	512 bytes
Interface	Bidirectional Parallel Standard - IEEE 1284 COMPATIBLE MODE - IEEE 1284 NIBBLE MODE - IEEE 1284 BYTE MODE - IEEE 1284 ECP WITHOUT RLE - IEEE 1284 ECP WITH RLE USB Interface Standard - USB 1.0 compliant - 12Mbps 1 port
Interface Switching	Automatic (Parallel, USB)
Interface Time Out	5 min (max.)

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1. Precautions

1-1 Safety Precautions

Read each caution carefully:

1. Do not use this printer near water or when exposed to inclement weather.
2. Do not place this printer on an unstable cart, stand or table; the product may fall, causing serious damage to the product.
3. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation and to protect the printer from everheating, do not block or cover any of these openings. Do not place the printer in an enclosure unless the enclosure provides adequate ventilation.
4. Never push objects of any kind into the printer through the cabinet ventilation slots as they may touch dangerous high voltage points, create short circuits, cause a fire, or produce an electrical shock. Never spill liquid of any kind on the printer.
5. Do not place the printer in a location where someone may trip on the cords.
6. Select a work surface that is large enough to hold the printer.
7. Position the printer within six feet of the computer and within five feet of an electrical outlet.
8. Operate this printer using the power source (110V, 220V, etc) indicated on the marking label. If you are not sure of the type of power source available, consult your dealer or local power company.
9. If you need to use an extension power cord with this printer, make sure that it uses a three-wire grounded cord and that the total ampere ratings for all of the products using the extension do not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.
10. Do not allow anything to rest on the power cord or data communications cable.
11. Unplug this printer from the wall outlet before cleaning. Do not use liquid cleaners or aerosol sprays. Use a damp cloth for cleaning.
12. Do not touch the surface of the photo-sensitive drum as marks or scratches may impair print quality.
13. Do not expose the drum unit to direct light for prolonged periods.
14. Use only standard papers, OHP films, and approved envelopes. Feed OHP films though the manual feed slot only. See specifications for approved papers and envelopes.
15. Other than replacing consumables such as paper and toner, refer all questions to qualified service personnel.

LASER STATEMENT (LASERTURVALLISUUS)

WARNING : NEVER OPERATE AND SERVICE THE PRINTER WITH THE PROTECTIVE COVER REMOVED FROM LASER/SCANNER ASSEMBLY. THE REFLECTIVE BEAM, ALTHOUGH INVISIBLE, CAN DAMAGE YOUR EYES.

Class 1 laser product

Luokan 1 laserlaite
Klass 1 laser apparat

Allonpituus 770-795nm
Teho 0.29mW±0.02mW

CAUTION INVISIBLE LASER RADIATION WHEN THIS COVER OPEN. DO NOT OPEN THIS COVER.

VORSICHT UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEOFFNET. NIGHT DEM STRAHL AUSSETZEN.

ATTENTION REYONNEMENT LASER INVISIBLE EN CAS D'OUVERTURE. EXPOSITION DANGERUSE AU FAISCEAU.

ATTENZIONE RADIAZIONE LASER INVISIBLE IN CASO DI APERTURA. EVITARE L'ESPOSIZONE LA FASCIO.

PRECAUCION REDIACION LASER INVISIBLE CUANDO SE ABRE. EVITAR EXPONERSE AL RAYO.

CAUTION : Avoid exposure to invisible laser radiation when the development unit is not installed.

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1-2 Servicing Precautions

Note : Requirements for AC power are described on the label affixed to the rear of the printer. Check the AC voltage rating requirement before use.

1. Before disassembly, pull the power plug from the AC power connector.
2. To avoid spilling toner inside the machine, do not turn the printer over or on its side before removing the developer cartridge.
3. Faulty installation of DRAMs may cause permanent damage to the Laser Printer.
4. Use only+5V power for video controller-related circuitry.
5. When replacing parts, use only the same type of part as the original. Replacing components with a second vendor's part may cause faulty operation.
6. Check the insulation between the blades of the AC plug and accessible conductive parts (examples : metal panels and input ports).
7. Insulation Checking Procedure:
   Disconnect the power cord from the AC power source. Connect an insulation resistance meter (500V) to the blades of the AC plug.

   The insulation resistance between each blade of the AC plug and accessible conductive parts (see left) should be greater than 1 megaohm.
8. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
9. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the positive lead; always remove the instrument's ground lead last.

1-3 ESD Precautions

Some semiconductor ("solid state") devices are easily damaged from static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESDs); examples include integrated circuits (ICs), Large-Scale Integrated circuits (LSIs), some field-effect transistors, and semiconductor chip components. The following techniques will reduce the occurrence of component damage caused by static electricity:

CAUTION : Be sure the power is off to the chassis or circuit board, and observe all other safety precautions

1. Immediately before handling any semiconductor components assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist strap device. (Be sure to remove the strap before applying power to the unit under test to avoid potential shock.)
2. After removing ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of an electrostatic charge.
3. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESDs.
4. Use only a ground-tip soldering iron when soldering or desoldering ESDs.
5. Use only anti-static solder removal device. Some solder removal devices are not rated as "anti-static;"these can accumulate sufficient electrical charge to damage ESDs.
6. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are package with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
7. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
8. Minimize body motions when handling unpackaged replacement ESDs. Motion such as your clothes brushing together, or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESC.
9. Handle ICs and EPROMs carefully to avoid bending a pin.
10. Pay attention to the direction of parts when mounting or inserting them on a PCB.
11. Components can be permanently damaged if heated for longer than necessary while welding. All components are susceptible to heat damage.

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